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# China Report

ECONOMIC AFFAIRS

ENERGY: STATUS AND DEVELOPMENT -- XXIV

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21 February 1984

# CHINA REPORT

## ECONOMIC AFFAIRS

### ENERGY: STATUS AND DEVELOPMENT -- XXIV

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## NATIONAL POLICY

### SHANXI ENERGY-INDUSTRIAL BASE: VITAL LINK IN MODERNIZATION PLANS

Beijing ZHONGGUO JINGJI RIBAO in Chinese No 3, 15 Sep 83 pp 27-29

[Article by Xia Guocai [1115 0948 2988]: "Accelerating the Development of an Energy-Heavy-Chemical Industrial Base in Shanxi Is a Major Strategic Decision in China's Modernization Program"]

[Text] Accelerating the development of energy is a priority in and a guarantee to achieving the grand goal set forth at the 12th party congress. The State Council's decision to develop Shanxi Province into an energy, heavy, and chemical industrial base is one of great strategic importance.

#### 1. Basic Conditions of the Base

The Shanxi energy-heavy-chemical industrial base covers four regions: all of Shanxi Province, the western part of Nei Monggol bounded by the Huang He (including the Beijing-Baotou and Baotou-Lanzhou railroads in this region), western Henan, i.e., west of the Beijing-Hankou railroad; and northern Shaanxi, i.e., north of the Lanzhou-Lianyungang railroad, with a total area of 329,000 square kilometers and a population of 60 million.

The base contains rich coal resources and a wealth of minerals for the heavy and chemical industries. Prospective coal reserves are estimated at 2 trillion tons, accounting for 40 percent of the national total. Of this, proven reserves account for 60 percent of the national total. The natural endowments of the coal reserves are favorable and the geological structures and hydrological conditions are simple. The deposits are close to the surface and, with the exception of the Pingdingshan Mines, the general mining depth ranges from 100 to 200 meters, less than half the national average depth and suitable for strip, adit and slope mining. The coal is excellent quality, with a full range of types. Datong of Shanxi Province, Dongsheng of the Nei Monggol region, and Yulin of Shaanxi Province are all rich in fine-quality Jurassic coal for power station use and the prospective reserves are estimated at 170 billion tons. The ash content of the raw coal is 7-10 percent, the sulfur content 0.3-0.5 percent, and the calorific value over 5,700 Kcal. Using this type of coal to generate electricity will release much rail transportation capacity, simplify the sulfur and ash removal systems in the power plants, and cut down investments in primary and secondary development of energy. Reserves of fine-quality rich coal and proven reserves of coking coal in the Gujiao, Huoxian, Xiangning, and Xishan mining areas account for

44 and 45 percent respectively of the national totals. These are the urgently needed "vitamins" for the coking industry. The Qinshui Coalfield is China's largest fine-quality anthracite coalfield. The coal here is low in sulfur and ash content and high in calorific value. A ton of anthracite coal is as effective as 2 tons of raw coal when the Jincheng anthracite lump coal is used to produce chemical fertilizer or when the Jincheng pulverized coal is used in blast furnace jet top blowing. The base is also rich in alumina, the prospective reserve of which is estimated to make up more than half the national total. Of this, the alumina resources in Shanxi and Henan rank first and second respectively in the country. Nei Monggol is rich in such chemical industrial minerals as sulfuric iron ore, salt, mirabilite, crude soda, and gypsum, and will be China's major supplier of sulfuric iron ore and mirabilite. Considerable reserves of iron ores are found in Lanxian in Shanxi and Bayan Obo in Nei Monggol; sizeable amounts of copper ores are found in the Shongtiao Mountains of Shanxi Province; and oil and natural gas exist in the Yih Ju Meng and Ulanqao Meng in Nei Monggol and in northern Henan Province. Building the region into an energy, heavy and chemical industries base of high energy consumption and low water consumption is of extremely important practical significance in accelerating China's energy development and insuring the achievement of the grand goal of quadrupling the gross industrial and agricultural output value by the end of the century.

In the more than 30 years since the founding of the People's Republic, through capital construction and technical reforms, the region has by and large become an important commodity coal base. It has also made solid progress in developing power, steel, chemical, and nonferrous industries. The region's 1982 coal production was 205 million tons, about 31.5 percent of the national output. Its commodity coal shipped out accounted for approximately 85 percent of all commodity coal shipped to places outside the producing provinces. Output of such products as volume of power generated, steel, and coke made up more than 10 percent of the national totals. At 300,000 tons, production of mirabilite accounted for about 60 percent of the national total. Output of such chemical products as vulcanized soda and rubber chloride made up about a third of the national totals.

## 2. Three Major Constraints in the Building of the Base

There are three constraints in the construction of the base. First, rail transport falls far short of the needs in the development of the energy, heavy and chemical industries. In the last 3 years, the shipping of Shanxi coal to areas outside the province has been increasing at about 8 million tons a year. This, plus the transportation of other goods and materials, would take up the transport capacity of roughly an entire single-track rail line for a year, or the transport capacity of an entire single-track electrified rail line for 2 years. In 1982, Shanxi coal shipped by rail amounted to 89 percent of the total railroad shipping volume. Even by guaranteeing the transport of coal at the expense of other goods all of the coal produced cannot be brought out. The province's stockpiled coal in the first 6 months of 1983 reached 25 million tons. In view of the planned development of coal mines and railroad construction, it is a foregone conclusion that before 1990, Shanxi's coal production quotas must necessarily be determined by the available transport capacity.



Second, serious lack of water resources. The base is situated in the middle and lower reaches of the Huang He where water resources are seriously lacking, the annual average precipitation is only about half the national average. The annual amount of evaporation in central and western Nei Monggol and Yulin in northern Shaanxi is even higher than the amount of precipitation. Initial calculation showed that the multiyear average amount of water resources of the three provinces and one region was 150 billion cubic meters, or 5.5 percent of the national total. Also, influenced by the monsoon, over 60 percent of the annual rainfall is concentrated in the months of July, August and September, and run-off in the form of heavy rainstorms makes it difficult to retain the flow. This aggravates industrial and agricultural production and the people's life. For example, the city of Taiyuan needs 1.03 million tons of water daily, but the existing water sources are only able to supply 830,000 tons, a shortage of 200,000 tons. Life in the city is adjusted to intermittent and low-pressure supply of water. The salt ponds in Yuncheng in Shanxi Province used to produce 1 million tons of salt a year. Lack of water has cut back salt output to 600,000 tons. In such areas as Datong, Taiyuan and Yuncheng where industries are concentrated and agriculture is fairly developed, overtapping of underground water has resulted in surface sinking over an area of 3,000 square kilometers. Of this, 400 square kilometers are in the Taiyuan area, where some places have sunk as much as 1.2 meters. The flow of spring water at Jinci in Taiyuan has decreased from 2.08 m<sup>3</sup>/second to 0.61 m<sup>3</sup>/second. Development of the energy, heavy and chemical industries in the base will aggravate the lack of water resources.

Third, scientific and technical forces fall short of the requirements of construction. The economic results of the production of energy, heavy and chemical industries as well as those of capital construction are not satisfactory. The output and techno-economic indicators of some products are generally lower than the average national levels. A major reason for this is backward scientific and technical management and inadequate scientific and technical forces in relation to the needs of the base in production and construction. In Shanxi Province, there are only 606 scientific and technical personnel to every 10,000 staff members and workers, ranking 25th in the nation. An additional 70,000 to 100,000 scientific and technical personnel are urgently needed in the province, with the coal system needing 10,000 to 60,000 people. Aging is a serious problem in the scientific and technical ranks. An initial projection shows that only about 20 percent of the engineers have kept abreast of modern science and technology and only 30 percent of the scientific and technical personnel are under 35 years of age. Poor management has resulted in serious misuse of qualified personnel. A 1978 general survey showed that as many as 30,000 people were not in work posts that utilized their specializations. With some effort, adjustment has been made for some 7,000 people, but a fair-sized contingent of truly qualified personnel have yet to be transferred to suitable work posts. The situation is basically the same or worse in other provinces (regions).

### 3. Tentative Ideas on the Development of the Energy, Heavy and Chemical Industries in the Next 20 Years

To meet the needs of quadrupling China's gross industrial and agricultural output in the next 20 years, the Ministry of Coal Industry has worked out a

tentative plan to produce 1.2 billion tons of raw coal by the year 2000, doubling coal output in 20 years. Of this figure, this base will supply 600 million tons, which means doubling coal output in 20 years. The Ministry of Water Resources and Electric Power has worked out a tentative plan to vastly increase thermoelectric installations in the next 20 years. In other words, the base will, in the next 18 years, complete the production tasks of coal (600 million tons) and the production and installation of hydroelectric units that had previously taken the 32 years since the founding of the People's Republic to achieve. Coal and electricity produced here will generally match the industrial energy requirements of the whole country. Simultaneously, efforts will be made to develop such heavy and chemical industrial products as alumina, sulfuric iron ore, clean molybdenum ore, and salt, and such high energy-consuming and low water-consuming heavy and chemical industrial products as steel, aluminum, sodium carbonate and glass. This is a major project requiring careful attention, and the first thing to do is to make careful plans.

(1) Persist in an overall point of view taking the whole country into account.

The decision of the Party Central Committee and the State Council to build up an energy, heavy and chemical industrial base centered around Shanxi Province proceeds from the foremost goal of modernizing the country. This is an important strategic decision, a major undertaking involving the layout of the entire national economy, a glorious task entrusted to us by the party and the state. At the same time we must promote the economic development of the entire base area to create economic prosperity, scientific progress and improvement of the standard of living.

(2) Persist in the viewpoint of development and the policy of long-range construction.

Building up a base is a project of lasting importance, not a measure of expediency. In the next several decades, China will not change from the basic policy of making coal the chief source of energy. The Shanxi base of energy, heavy and chemical industries will play a long-term role in the building of socialism in China. It will promote the national economic development even while it is being built up. In planning, therefore, we must take a broad, long-term view, basing ourselves on the present but looking far ahead, and work for steady growth in production. In the course of construction and technical reform, we must consistently aim at thrift in investments, quick results and economic effectiveness. We must call for overall planning, construction in stages, and going into operation in stages. In this way some large-scale projects (such as railroads and large mines) will be able to gradually become economically effective even while they are being built.

(3) Persist in the viewpoint of rational distribution and overall balance.

The Shanxi base is a comprehensive base area with energy as the chief sector, but including transportation and heavy and chemical industries, and encompassing three provinces and a region. It is important to make overall plans, take

all factors into consideration, attempt to dovetail the plans of the different sectors, and achieve synchronized construction.

Priority should be given to railroads and the overhaul of transportation technology. With regard to existing railroads used for transporting coal, efforts should be stepped up to electrify the lines and upgrade technology. With regard to planned new coal transport lines such as the Taiyuan-Qinhuangdao railroad, efforts should concentrate on preconstruction preparation work. Close attention should also be given to the reconstruction and building of ports above and below Qinhuangdao, Shijiusuo, Shanghai and Huangpudao, and highway construction within the base area, in order to form an unimpeded railroad network to suit the needs of shipping coal out of the base area. The construction of hydroelectric power stations should be planned according to the base area's industrial and agricultural growth, the load increases in the Beijing-Tianjin area and other neighboring areas, and the findings regarding coal and water resources in the base area.

(4) Persist in the viewpoint of economy, pay attention to economic effectiveness, and strive to do more with less money. Preparation work of all projects must be done well and priority be given to the needs of railroad, highway and coal mine projects. Corresponding economic, technical, labor and organization policies must be studied and developed to make sure that the building of the base area can be effectively implemented.

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## NATIONAL POLICY

### ACCELERATED BUILDING OF AN ENERGY-INDUSTRIAL COMPLEX IN SHANXI

Taiyuan SHANXI RIBAO in Chinese 3 Oct 83 p 3

[Article by Zhang Guoyan [1728 0948 1750]: "Unify Understanding, Unify Action, and Hasten the Building of Energy, Heavy Industry, and Chemical Industry Bases"]

[Excerpts] Both the CPC Central Committee and the State Council have given clear instructions on the need to build powerful energy, heavy industry, and chemical industry bases in Shanxi Province in order for China to quadruple the gross output value of its industry and agriculture by the end of this century. This major strategic plan will be a central task for the people of Shanxi Province for a fairly long time to come.

#### A Practical and Realistic Policy Decision

Some comrades are apprehensive lest the building of energy, heavy industry, and chemical industry bases, with emphasis on developing coal as well as electric power, heavy industry, and the chemical industry may be a mistake similar to "taking steel as the key link," and "taking grain as the key link," a new proportional imbalance thereby occurring. Such apprehensions are misplaced.

Following the Third Plenary Session of the 11th Party Central Committee, the national economic situation has improved year after year and has gradually taken a path of healthy development. However, quite a few problems still exist, the most conspicuous of which are an energy shortage and inadequate transportation capacity. In the building of an economy, an energy shortage is like a person lacking grain. It can seriously impair the healthy growth of the entire national economy. Departments concerned have estimated that about 20 percent of the country's present industrial production capacity cannot be brought into play for lack of coal and electricity. During 1983, supplies of coal and electricity have become even tighter. For a considerable time to come, limited resources and limited scientific and technical conditions will mean that petroleum, natural gas, atomic energy, and solar energy will not become major sources of energy. Thus, coal, which currently accounts for 70 percent of all energy consumption, will be the most vital and most certain source of energy. It has been forecast that a quadrupling of the gross output value of industry and agriculture by the end of this century will require 2.4 billion tons of standard coal. Even when savings of energy have been deducted, 1.2 billion tons of raw coal will be required. Given an ample supply of coal, the building of the national economy will be able to soar to new heights.

The superior coal resources with which Shanxi Province has been endowed, and its coal industry bases are extremely favorable for building energy, heavy industry, and chemical industry bases. The province's 200 billion tons of proven coal reserves amount to one-third of all proven reserves in the country. Furthermore, coal exists in all varieties; its heat value is fairly high, it lies close to the surface making for easy mining, and geological conditions are extremely favorable. The province's people possess traditional experience and skills in coal production, and a coal industry system of substantial proportions has come into being as a result of 30 years of building. A 500,000-strong corps of coal miners, technical personnel and managerial cadres has been created who are quite technically proficient and who have rather plentiful experience. Consequently, the building of energy, heavy industry, and chemical industry bases with coal as the centerpiece has a bearing on the overall situation of the four modernizations and also makes the most of the province's advantages, accelerates development of the province's national economy, and is also a road that must be taken for the steadily growing material and cultural life of the province's people.

The building of bases centering around coal is by no means to "take coal as the key link," nor will there be any problems with proportional imbalance such as have occurred twice since founding of the People's Republic. First of all, those two proportional imbalances resulted from excessive demands on the part of the guiding thought, neglect of national circumstances, and a lack of realism and practicality. The present building of energy, heavy industry, and chemical industry bases is founded on natural conditions and natural resources in Shanxi Province, on the features of historical development, and on the existing foundation. It is a realistic and practical strategic policy decision on a specially designated provincial scale. Second, unrealistically high norms and misguided direction that failed to observe objective economic laws were other major reasons for the previous two serious proportional imbalances. This time in planning energy, heavy industry, and chemical industry bases, the province has linked needs and possibilities. Only after departments concerned and numerous experts debated matters scientifically countless times, and repeatedly made an overall balance, was planning guidance preliminarily set for each individual stage. Thus, the plans this time are practical and realistic, positive, and reliable. Third, failure to adhere to overall balance, sole concern with key points, lack of concern for proportions, and one-sided notions about "everything falling into place once the key link has been grasped" was yet another reason for the proportional imbalance of the previous two times. In future building of energy, heavy industry, and chemical industry bases, emphasis must go to development of coal, electric power, heavy industry and the chemical industry, and development of heavy industrial products requiring high energy consumption and little use of water such as ferroalloys and calcium carbide. However, on no account can there be any relaxation in agriculture, and some light industry linked to the province's characteristics must be developed. There can be no sole pursuit of coal to the neglect of overall balance. Planning work in this regard has been in train for more than a year already, and initial success has been achieved. Fourth, the proportional imbalance that took place between 1958 and 1959 had yet another reason, namely natural calamities to agriculture, the "tendency to effect the transition to communism prematurely," and the perfidy of the USSR. Naturally there were mistakes in work as well. In today's building

of energy, heavy industry, and chemical industry bases, we have accumulated more than 30 years of positive and negative experiences. More importantly, our party has summarized historical experiences, and has formulated a series of socialist programs and policies for construction that have a distinct Chinese flavor, and this is a most important guarantee for our building of energy, heavy industry, and chemical industry bases.

In short, the present building of energy, heavy industry, and chemical industry bases centering around coal proceeds from the province's realities, and takes conscientious account of the lessons of historical experience. Planning of the speed and scale of the building of production is based on what national resources will support. Not only can no proportional imbalance in the national economy occur, but impetus will be given to development of the national economy and due contribution made to realization of the four modernizations.

#### Without Key Points, There Is No Policy

Some comrades feel that because of a low self-sufficiency rate for products that Shanxi Province is able to provide, the heavy economic structure should be changed with all trades and industries advancing along evenly. Such an understanding is incomplete.

As in other work, economic construction requires a firm hold on key points and a firm grasp on major contradictions. Unless there is an emphasis, there can be no policy. The emphasis can only be determined after overall balancing by the CPC Central Committee and the State Council on the basis of the overall situation and long-term requirements. It cannot be set arbitrarily by any region or any sector. Since the state has designated Shanxi Province for the building of energy, heavy industry, and chemical industry bases to serve the whole country, we should bend every effort toward building them. Setting aside this emphasis, establishing no priorities, and going along evenly would be like what Comrade Mao Zedong termed "completely at a loss and able neither to find the center nor to find a way to solve contradictions." The building of energy, heavy industry, and chemical industry bases is a major matter that relates to prospects for building the four modernizations, and relates to the fundamental well-being of the people of the whole country. We must subordinate the parts to the whole and present benefits to long-term benefits, using a spirit of sacrificing chariots and horses to protect generals and marshals [as in Chinese chess] to assure that energy, heavy industry, and chemical industry bases will be built as scheduled. Furthermore, national financial and economic constraints means that there is just so much financial and material resources available, so unless key points are gripped firmly, limited financial and material resources will be squandered. Too little will mean great losses, and passivity will be pervasive.

What kind of economic structure should be built in Shanxi Province? Should an open economic structure in which energy, heavy industry, and chemical industries predominate be built, or should a closed self-contained economic structure that is small but all-embracing, or large and all-embracing that does everything without outside assistance and is self-sufficient be built? The answer is surely the former rather than the latter. Under contemporary conditions, no country can have all the resources required for development of its own national

economy or possess all the world's advanced technology, or produce everything needed in its own country. For a province to try to do what a country cannot do is even more impossible. There is no denying that Shanxi Province's agriculture and light industry are rather weak. However, by making the most of our strengths and building as quickly as possible energy, heavy industry, and chemical industry bases around coal, and building an open economic system, it will be possible to use the economic benefits derived from coal, electric power, heavy industry, and the chemical industry to strengthen the weaknesses of agriculture and light industry and use our own strengths to make up for our weaknesses. Moreover, with increased expansion of goods exchange, and through economic and technical exchanges within and without the country, one place supplying the needs of another, and bringing about overall balance, social expansion of reproduction can proceed smoothly. Were every trade and industry to advance evenly, practice small but complete or large and complete, all economic sectors evenly distributing forces, we most certainly would not be brought to the ideal state of the four modernizations. This could only lead to a natural economic kingdom in which we would be imprisoned in a place of our own creation and enmeshed in a web of our own spinning. Therefore, adherence to taking the whole country as a chessboard, Shanxi helping the whole country and the whole country helping Shanxi, with development of a commodity economy of large scale production, great coal production, and large exports of energy to give impetus to the rational building of an open economic system should be the major guiding thought in the building of energy, heavy industry, and chemical industry bases.

Doesn't our emphasis on key points and concerted efforts to build energy, heavy industry, and chemical industry bases mean a lack of concern about ordinary construction? No. Just as it is necessary to have flesh on bones, key construction also requires commensurate general construction. For example, the building of a large coal mine will require corresponding transportation facilities, electric power supply, water and sewer lines, staff member and worker housing, business services, culture and education, athletics and medicine. Even kindergartens will be required. Unless such corresponding facilities are built, key projects will be unable to play their full role.

#### Food First and Construction Second

Some comrades suppose that the building of key energy, heavy industry and chemical industry bases centering around coal will mean a slowing of the improvement in the living standard of urban and rural people in the provinces, and that their standard of living will increasingly become lower than the national average. Such apprehensions are groundless.

During the 30-odd years since Liberation, with development of a production foundation, the material and cultural life of the people of the province has risen just as has been the case for the country as a whole. Everyone can see that this is true. It is necessary to realize as well, of course, that several political upheavals and mistakes made in economic work in the province have meant a fairly substantial accumulation of debts owing to the people's livelihood, and these lessons are deeply etched. However, the fundamental reason for the low standard of living is slow growth of production, which should not be equated with coal mining. On the contrary, it has been coal mining that has increased the income of the people of the province. Following the Third

Plenary Session of the 11th Party Central Committee, annual raw coal output in the province increased by more than 10 million tons. For the period 1979-1982, locally usable wealth in the province earned from oil and coal subsidies and income alone increased by 610 million yuan. Zuoyun County, which has always been regarded as "a place where nothing will grow" had earnings of more than 40 million yuan from coal mining during the period 1979-1982, which was 36.1 percent of the county's total earnings. A look ahead at prospects for building energy, heavy industry, and chemical industry bases shows not only a moderation of the energy shortage and support for the four modernizations, but also gradual increase in local revenues that will promote development of other undertakings, with the people's standard of living becoming slightly higher than the national average.

Comrade Deng Xiaoping pointed out that "We can only gradually improve life from a foundation of development of production. Development of production without improving livelihood is wrong. Likewise, to want to improve livelihood without developing production is also wrong and impossible as well." It must be realized that even while trying to make up for past mistakes in work and while preferring to reduce necessary construction in the midst of declining financial revenues, both the party and state have been at great pains to improve the people's livelihood. This has been necessary temporarily; however, it can only be a special measure taken for a certain period of time; it cannot continue for long. Comrade Chen Yun said, "First comes food and second comes construction. If everything is eaten and used up, the country will have no hope. Only when a surplus remains for construction after eating can the country have hope." If consumption funds increase too fast, there will be none of the accumulated funds needed for investment in energy, transportation, agriculture, education, science, and such important strategic matters. Normal development of the national economy will then be difficult to continue, and no material foundation will exist for sustained improvement of the people's livelihood. In addition, rise in the people's real standard of living will be limited by the amount of increase in the means of consumption. If social purchasing power increases too rapidly, and production of consumption goods used in daily life does not keep pace, a situation can come about whereby there is nothing to buy with one's money. As a result, the prices of goods will rise, and the people will gain no material benefits. Therefore, we must carry forward a pioneering spirit of arduous struggle, be practical and realistic, and quietly put our shoulders to the wheel. With future building of energy, heavy industry, and chemical industry bases, the livelihood of the people of the province will steadily improve. However, as far as the overall economy is concerned, growth of consumption funds cannot be greater than the development of production and growth of national income. Increases in staff members' and workers' average wages, bonuses, and welfare benefits must also be lower than the labor productivity rate and the degree of increase in taxes and profits paid the state. Increases in peasant income must also come primarily from the development of production and the lowering of costs, with no sole reliance on raising prices for agricultural sideline products. We must handle well the relationship between present benefits and long-term benefits, and we positively cannot be concerned solely with present benefits while abandoning long-term benefits.



## NATIONAL POLICY

### ENERGY PRODUCTION ENCOURAGING BUT STILL OUTSTRIPPED BY INDUSTRIAL GROWTH

OW031313 Beijing XINHUA in English 1243 GMT 3 Jan 84

[Text] Beijing, 3 January (XINHUA)--China produced 692 million tons of coal and 348 billion kilowatt-hours of electricity in 1983, both new all-time highs.

The country also pumped out 105.97 million tons of crude oil during the past year.

Geological surveys indicate that China has coal reserves of 770 billion tons. Development of coal, the country's primary source of energy, has been given top priority in economic planning. Mines are now being sunk nationwide with an aggregate production capacity of 133 million tons. Pits with a combined capacity of 14.68 million tons were put into production in 1983.

More efforts will also be made to develop hydropower generation. China is now constructing a number of hydroelectric power stations and thermal power plants for a total generating capacity of more than 20,000 megawatts. Large cascade hydropower stations will be built on major rivers in southwest, northwest and south China, and some medium-sized hydropower stations will be constructed in the northeast and east of the country.

China has a total of 380,000 megawatts of exploitable waterpower resources.

Efforts will be made to introduce new oil extracting technology to help ensure a steady rise in output of crude oil.

China has more than 1 million square kilometers of continental shelf of a water depth of 200 meters. Rich oil and gas resources have been discovered in six offshore sedimentary basins in the Bohai Sea, the Yellow Sea, the East China Sea, the Beibu Gulf, the Yingge Sea and the Pearl River Basin.

In 1983, China signed 18 contracts with foreign oil firms for joint exploration and development of its offshore oil resources. It is expected that a number of oil and gas fields will be put into production soon.

Geological surveys also show that China has 4.2 million square kilometers of sedimentary rock structures with oil and gas resources.

China also saved the equivalent of more than 100 million tons of standard coal, or about one-sixth of its total energy production output, by introducing new technology and improving industrial efficiency between 1979 and 1982.

Between 1979 and 1982, energy consumption rose by about 1.9 percent a year while industrial output increased by an annual average of 7.2 percent. Industrial production also rose faster than energy consumption in 1983.

CSO: 4010/28

## NATIONAL POLICY

### GUIZHOU TO BE MAJOR ENERGY PRODUCTION CENTER

OW260340 Beijing XINHUA in English 0251 GMT 26 Jan 84

[Text] Beijing, 26 Jan (XINHUA)--Guizhou Province will become a major energy production center in southwest China, following discovery of large coal reserves and surveys of hydropower resources, according to Han Zhijun, director of the provincial bureau of geology.

At a national conference called by the Ministry of Geology and Mineral Resources here, he told XINHUA today that Guizhou has found four large coalfields and 16 medium-sized and small ones, with verified reserves totalling about 50 billion tons.

Surveys of Guizhou's 740 rivers show that the province has an estimated hydroelectric power potential of 18.7 million kilowatts, placing it sixth in the country, he said.

Reports have already been submitted on 3,200 sites suitable for construction of hydroelectric power stations, the director said. Fourteen sites are suitable for construction of large stations with a generating capacity exceeding 250,000 kilowatts each and 110 sites for stations with a generating capacity of over 10,000 kilowatts each.

"When coal and waterpower resources are developed Guizhou will be able to meet its own needs and also aid energy-deficient neighboring provinces," Han said.

In addition, 86 minerals and 800 ore deposits have been found in the province, the director said. Guizhou accounts for 80 percent of China's mercury reserves and contains large reserves of aluminum, antimony, manganese and phosphorus. Rich reserves of pyrite, fluorspar, barite, limestone and other non-metallic minerals have also been discovered in the past few years, he said.

CSO: 4010/44

## NATIONAL POLICY

### BRIEFS

1984 ELECTRIC POWER TARGET--Beijing, 31 December (XINHUA)--China plans to produce 360 billion kw/hr of electricity in 1984, about 4 percent more than in 1983, the Ministry of Water Resources and Electric Power said here today. A total of 348 billion kWh of electricity has been generated so far this year, the ministry said. Hydraulic and thermal power stations and plants to produce 23,000 megawatts a year are now under construction, and generating units with a combined capacity of 2,800 megawatts will be put into operation by the end of 1984, the ministry added. More oil-burning power plants will also be converted to coal-fired systems. In the last 2 years of the Sixth Five-Year Plan (1984-1985), generating units with an aggregate capacity of 765 megawatts will be converted, the ministry said. The plan for 1984 is 329 megawatts, and this may help save 1.26 million tons of oil, it added. In the coming year, greater efforts will be made to upgrade the ministry's enterprises to improve their management and economic performance. [Text] [OW310726 Beijing XINHUA in English 0708 GMT 31 Dec 83]

CSO: 4010/28

## NEW TECHNOLOGY

### NEW ADVANCES MAY MAKE LIQUID COAL PASTE VIABLE ENERGY SOURCE

Beijing XIANDAIHUA /MODERNIZATION/ in Chinese No 10, 25 Oct 83 p 3

/Article by Zhu Zhiyao /2612 1807 1031/ /

/Excerpts/ Coal is a bulky commodity which presents difficult problems of transportation. The six major railroad lines in China are used to transport coal 60 percent of the time. In addition, coal storage is also a difficult problem; burning coal will produce large amounts of waste gas and residue, causing large-scale pollution of the environment. If the 600 million tons of coal produced annually in China were burned directly, the amount of sulfur dioxide gas produced would exceed 10 million tons. Sulfur dioxide is the primary culprit of atmospheric pollution and may cause harmful acid rain. In addition, it will produce polycyclic organic arene--benzopyrene--which is a highly toxic carcinogen.

A basic approach to solve these problems is to transform the solid coal into gas or liquid before burning. However, either liquefaction or gasification requires destroying and rearranging the molecular structure of coal. This is a complicated, technically difficult, and very costly procedure.

But is it possible to convert coal into a liquid fuel by using physical methods without altering its basic structure? In 1973, Swedish scientists first studied this problem. They first ground coal into tiny particles which are only several tens of microns (1 micron =  $10^{-6}$  m) in diameter; then they removed the dust and impurities, and mixed it with small amount of additives and water to produce a low-cost, clean, and gel-like new kind of fuel--liquid coal paste.

This coal and water mixture is remarkably easy to burn. Like motor oil, it is in the form of a homogeneous liquid; it can be easily ignited, and maintains a stable and full flame during combustion. Its heat generation capability is comparable to that of coal lumps, and its combustion efficiency is as high as 80-90 percent. As a result of the higher thermal efficiency, a large amount of coal resources can be saved.

Because of the current shortage of petroleum resources, replacing oil by coal is an issue of worldwide concern. The liquid coal paste can be used in place of petroleum; and the cost of modifying existing boilers in power stations and industrial furnaces to accommodate liquid coal paste is quite moderate. The

application of coal paste can be extended further to replace the fuel used in turbines and internal combustion engines.

Liquid coal paste can be produced and processed using rather simple techniques; it can be transported through pipes and stored in barrels; hence it is very attractive from the economic point of view. For direct burning, liquid coal paste requires condensation only at the terminal point, so a considerable amount of construction cost can be saved. Liquid coal paste can be produced from any type of coal; but it is most economical to use the waste coal from coal sifting factories. This not only results in a higher coal recovery rate, but also increases the scope of utilizing coal resources.

Test results in China show that the amount of nitrogen oxide emitted from burning liquid coal paste is 20 percent less than produced from burning coal powder, and the rate of sulfur removal is 20 percent higher; also the large dust particles in liquid coal paste are easier to capture.

There is evidence that liquid coal paste can be substituted for various types of fuel: fuel for industrial boilers and locomotives, fuel for cement kilns, raw material for synthetic ammonia, fuel for metallurgical furnaces, and fuel for marine diesels.

Consequently, the value of liquid coal paste is greatly enhanced. Following Sweden, the United States, the Soviet Union, West Germany, and Japan all began to study the use of liquid coal paste. Sweden and Canada are planning to join forces in developing a liquid coal paste plant with an annual production of 2.5 million tons. Sweden plans to reduce the amount of imported petroleum by one-third by using liquid coal paste to replace part of the petroleum. The United States is also conducting actual field tests. Although the thermal value of liquid coal paste is only 60 percent that of petroleum, its price is two-thirds, or at least 50 percent, cheaper. Some energy experts believe that by 1985, liquid coal paste may become a widely accepted new liquid fuel.

Good quality liquid coal paste should be highly stable and should maintain its homogeneous texture over long storage periods. To achieve this, the following two procedures are critical: 1) the coal particles must be ground to a size smaller than 90 microns in diameter (i.e., less than 0.09 mm); 2) a small amount of additives (a negative scattered-ion type active compound) should be added. The liquid coal paste produced in Sweden can be stored in a stable condition for over 8 months.

Liquid coal paste must be made from purified coal with very low dust content as the combustion efficiency will be adversely affected if the dust content is too high.

Liquid coal paste must also have the correct proportion of coal and water. Based on thermal value considerations, the coal content should be as high as possible; but other factors must also be considered, for example, the liquid coal paste must be sufficiently fluid for ease of transportation. At present, the coal-to-water ratio may be 75 to 25. This means that 1 ton of coal can produce 1.3 tons of liquid coal paste.

Of course, there are certain difficulties associated with manufacturing and burning liquid coal paste. Advanced coal sifting processes and equipment must be used to achieve low dust content--less than four percent. Special grinders must be used to pulverize the coal powder into very fine particles in order to achieve the desired properties and good combustion efficiency. The additives used to stabilize the liquid coal paste must be good quality, available in large quantities, low cost, and do not produce toxic or harmful waste. One of the biggest problems seems to be the fact that liquid coal paste has much higher dust content than petroleum, which will form residues over the heat transfer surface, and result in increased heat loss and lower combustion efficiency. However, these problems undoubtedly will be resolved by further research efforts.

Since 1981, a dozen or so organizations in China have been actively engaged in related experimental work. In particular, the work done by the Chinese Mining Institute in producing liquid coal paste and the research work done by Zhejiang University in combustion technology is playing an important role in advancing China's technology in liquid coal paste research. It is believed that in the near future, liquid coal paste will become an effective energy source to replace petroleum both abroad and in this country.

3012  
CSO: 4013/41

## NEW TECHNOLOGY

### FLUIDIZED-BED COMBUSTION TECHNOLOGY MATCHES WORLD LEVEL

Beijing GUANGMING RIBAO in Chinese 23 Aug 83 p 1

[Article by Tang Xun [0781 2484] and Wu Yinfang [0702 5593 2455]: "Our Fluidized-bed Combustion and Application Technology Matches World Level--International Academic Meeting Held in Beijing"]

[Text] The International Fluidized-bed Combustion and Application Conference jointly sponsored by Qinghua University and McGraw Hill Publishing Company of the U.S. was held in Beijing on the morning of 22 August. Over 100 scholars and technical experts from four continents and seventeen countries attended the meeting. This one of the larger professional international energy academic meetings held in China in recent years. In the opening ceremony, the vice president of Qinghua University, Professor Zhang Guangdou [1728 0342 2435], and the vice chairman of the board of McGraw Hill, Mr Slater, each spoke. On the afternoon of the 22nd, Minister of Education He Dongchang met with the delegates at the Xiangshan Hotel in Beijing.

Fluidized-bed combustion has been developed rapidly in recent years. It is a new technology using a fluidized-bed furnace to achieve combustion. The current international energy community is very serious about the development and application of this new technology. This combustion method can consume low quality coal such as gangue, oil shale, brown coal, and soft coal in a stable fashion with high efficiency. Today, China has over 2,000 fluidized-bed furnaces of various types used mainly in industrial production, heating, and power generation. The number of furnaces, the length of operating time, and the proportion of low quality coal used are number one in the world. Also, considerable experience has been accumulated in the areas of design, manufacture, and operating technology of small and medium fluidized-bed furnaces. Important theoretical study results have been obtained which have drawn the attention and praise of the international academic community.

Academic exchange activities will be carried out in the meeting from 23-25 August. At the meeting, representatives of 12 countries will read over 30 academic papers, including 13 papers from China. After the meeting is over, the delegates will be organized to visit three plants in the Tangshan-Qinhuangdao area, and in Jiangmen in Guangdong, which use three different types of fluidized-bed furnaces. Academic exchanges will be carried out on site.

12553

CSO: 4013/36



## NEW TECHNOLOGY

### FLUIDIZED-BED BOILER PASSES TECHNICAL APPRAISAL

Fuzhou FUJIAN RIBAO in Chinese 14 Nov 83 p 1

[Article by Xue Yuansong [5641 3293 2646] and Fang Yijian [2455 3015 1017]]

[Text] The SHF 6-13-WII fluidized-bed boiler, which was jointly developed by the Provincial Petroleum and Chemical Design Institute and the Fuzhou Chemical Machinery Factory, passed technical appraisal on the 10th of this month.

This 6-ton fluidized-bed boiler has been designated by the provincial scientific committee and the provincial financial committee as a critical item for scientific research. The boiler is capable of burning grade II smokeless coal which cannot be burned in conventional boilers, and its thermal efficiency is as high as 78.3 percent, which exceeds the ministry specification of 57 percent. Since September of last year, four prototype boilers have been operating at four synthetic ammonia plants in Liancheng, Youxi, Nanning, and Lianjiang; tests of burning different types of coal have been carried out with outstanding energy-saving results. The 62 representatives from 37 research, academic, and production organizations who participated in the appraisal reviewed the design blueprints, and performed actual measurements of its thermal efficiency. They agreed that this boiler is satisfactory in terms of structural design, performance, ease of operation, technical maturity, and thermal efficiency. Promoting the use of this boiler will play an important role in exploiting the energy resources of this province and in the energy conservation effort.

3012

CSO: 4013/53

## NEW TECHNOLOGY

### BRIEFS

COAL-OIL-MIXTURE EXPERIMENT--Anshan, 8 December (XINHUA)--China's first industrial experiment on using boilers burning a mixture of coal and oil was appraised at the Anshan iron and steel complex here today. The technology for the high-priority project has been under development since 1981 in a bid to help save petroleum. More than 100 scientists and engineers took part in the experiment at the Anshan power plant. Over 5,000 hours of trial burning showed that the boiler was as efficient as a unit of the same type burning oil. The appraisal committee concluded that the new technology could help save 35 percent of oil needed to fire one boiler. The appraisal was sponsored by the Chinese Academy of Sciences and the State Planning Commission. [Text]  
[OW081735 Beijing XINHUA in English 1648 GMT 8 Dec 83]

CSO: 4010/22

## POWER NETWORK

### CHRONIC POWER SHORTAGES NOW FACT OF LIFE IN SICHUAN

Chengdu SICHUAN RIBAO in Chinese 18 Oct 83 p 2

/Article by Wang Zunxiang /3769 1415 4161/, member of Sichuan Provincial Party Committee/

/Excerpts/ Today, economic growth is hobbled by our province's strained energy resources and transportation.

After the "gang of four" was smashed, especially since the 3d Plenum of the 11th CPC Congress, and with the elimination of "leftist" influences, industry and agriculture have developed rapidly in our province and the people's standard of living is steadily improving. However, power shortages are now a weak link in the development of the state economy in Sichuan. Especially this year, problems from power shortages have become even more acute. In the past, the power shortages in Sichuan occurred mainly during the dry season from January to April and from November to December, while demand for electricity was basically satisfied during the wet season from May to October and there were even occasional surpluses. However, because power consumption has increased at the rate of 200 MW annually, in combination with very small investments in new generators, for the first time power shortages began to surface during the wet season this year. During July and August, switches had to be thrown on 118 occasions, with power reductions of 200 MW. According to calculations, there will be a power shortfall of about 600 MW during the dry season and about 300 MW during the wet season this summer. These facts show that Sichuan has already entered a period of general power shortages. We have gone from seasonal power shortages (mainly during the dry season) to year-round power shortages, and from past regional power shortages (mainly in the Chongqing region) to province-wide power shortages. The old days of electric power being "tight in the winter and loose in the summer" each year are over.

Present electric power consumption levels in Sichuan are rather low compared to other provinces in the country. Average per capita electricity use in our province is 186 kWh, while agriculture uses an average of 19.5 kWh per mu, both levels being below the national averages. Seventy-two percent of the production teams in Sichuan, representing 63 percent of the rural population, do not have electricity. The thing that most deserves our attention is that the electric power industry has developed slowly in Sichuan, and there are few projects under construction. In the first 2 years of the Sixth 5-Year Plan, the ratio between

the growth rate for gross value of industrial and agricultural output and the growth rate of electric power in Sichuan was 1:0.62 and 1:0.65, respectively, and have fallen to their lowest level in history recently. From January through August of this year, the ratio between the growth rate for the gross value of industrial and agricultural output and the growth rate in electric power was 1:0.46, lower even than that for the first 2 years. At present, there are six hydropower and thermal power plants under construction, with a total installed capacity of 1,390 MW. Apart from making 180 MW operational this year and 50 MW next year, the remaining 1,160 (the 400 MW expansion of the Chongqing power plant, the second-cascade hydropower station at Yuzixi with 160 MW, and the Tongjiezhi hydropower station with 600 MW) will not be operational until 1986. According to plans (based on identical growth rates for electric power and for gross value of industrial and agricultural output), and taking all possibilities into account, it will be necessary to build 12 large and medium hydroelectric and thermal power stations and plants, over and above the current power generation projects. With construction and completion of these 12 hydroelectric and thermal power stations according to plans, it will still be 1995 before we have a basic equilibrium between supply and demand for electric power. Thus, electric power shortages will continue for a long time.

What can be done in the face of this serious electric power shortage? We feel that we must first acknowledge the strategic importance of electric power construction, and attract the attention of the whole party and all the people of the province. No developed or developing country in the world has such a record of stagnation in developing electric power. Since liberation, the electric power industry in Sichuan has developed at a rapid rate. During the period of the "10 chaotic years" with all the interference and destruction caused by the "gang of four," there was a reduction of over 1,000 MW in installed generator capacity. This is the basic reason for our present electricity shortage. Therefore, if we wish to resolve the problem of electricity shortages, the basic method is to guarantee key points and accelerate those projects under construction. The key projects for electric power which are currently under construction--the Yuzixi second-cascade station, the Tongjiezhi hydroelectric station, and the expansion of the Chongqing power plant, as well as the rebuilding and expansion project at the Baima power plant which will begin soon--are the main prospects for increasing electric power generating capacity during the Seventh 5-Year Plan. Apart from guaranteeing the organization of manpower, financial resources, and materials by electric power departments, we must do as we did to guarantee the key "156" project during the 1950's.

Second, we must give full play to the superiority of hydropower resources and speed up hydroelectric construction. Sichuan ranks first in the nation in hydropower reserves. However, as of 1982, the generating capacity and electric power output of all the completed hydroelectric power stations in Sichuan were only 2.4 percent and 1.42 percent of potential development capacity and electric power output, respectively, figures both below the national average. In 1982, total provincial energy consumption (converted to standard coal) was: hydroelectric power, 10.1 percent; coal, 72.6 percent; natural gas, 13 percent; and petroleum, 4.3 percent. Hydroelectric power represents a very low proportion of total energy consumption. At present, energy production in Sichuan for the first time has fallen below the growth rate of the gross value of industrial

and agricultural output. In some areas (such as coal and petroleum), there will be backward movement and even greater shortages as a result of insufficient resources. If we wish to quadruple the gross value of industrial and agricultural output in Sichuan, then we can only place our hopes on developing hydroelectric power as a supplement.

Hydroelectric power development must adhere to the policy of integrating large, medium and small stations, with large-scale stations as the backbone. In other words, while the state operates large-scale backbone hydroelectric power stations, organizations at the prefecture, county, commune, township, and team levels, as well as the broad masses, should be mobilized in all areas to provide financial and material resources for constructing very efficient, lower inundation loss, medium and small hydroelectric power stations with superior economic standards for kinetic energy. This will ease the pressure on the state, accelerate our progress in development of the electric power industry, and create the material conditions for development of the national economy, especially for rural electrification.

Third, speed up the early stages of capital construction work for electric power, and strive to create the conditions for early completion of projects. For the expansion of the Baima power plant and the construction of the Baozhusi hydroelectric station, which have completed initial construction, we should strive to bring the projects under the national plan and construct them earlier. We must concentrate on survey and design work for the hydroelectric stations at Ertan on the Yalong Jiang, at Pengshui on the Wu Jiang, and at Pubugou on the Dadu He, as well as for the thermal power plants at Luohuang in Jiangjin and at Huangjiaozhuang in Yibin. We must strive to complete feasibility studies and preparatory documents in order to put them into operation during the Seventh 5-Year Plan, and make good preparations for electric power during the Eighth 5-Year Plan and afterward.

Fourth, we should strengthen electric power network construction, perfect electric power networks, and remove bottlenecks to give full play to equipment potential at the Yuzixi, Moganggou and Gongzui power stations. While accelerating electric power construction in Sichuan, we must also strengthen the construction of a backbone network. We should strive to promote network integration with Yunnan, and strengthen the potential for electric power transmission between Sichuan and Guizhou. We must work to link up with the northwest network to permit mutual regulation in order to alleviate the recent electricity shortages in our province, to increase the reliability of safe electricity supplies, and to increase socioeconomic benefits.

12539

CSO: 4013/32

## POWER NETWORK

### TAIZHOU POWER PLANT BRINGS TREMENDOUS ECONOMIC BENEFIT TO REGION

Hangzhou ZHEJIANG RIBAO in Chinese 29 Sep 83 p 1

[Article by Zhou Nenghua [0718 5174 5478], Ruan Baoyau [7086 1405 0645], and Hu Zheqi [5170 0772 0796]: "Key Construction Benefits the People"]

[Text] After the generators of the Taizhou Power Plant--one of the nation's key capital construction projects--joined the network and began to feed power into the grid, eight counties and cities in the Taizhou area have been hooked up. From January to August 1983, total electricity consumption climbed to 207,330,000 kilowatt-hours, up 26.3 percent compared to the same period in 1982. Ample sources of electricity have boosted economic construction in Taizhou Prefecture and brought great benefit to the people.

#### Assuring Power Required by Industrial Production

From January through August, the industrial power consumption in the entire region was 116,273,000 kilowatt-hours, an increase of 14.3 percent over the same period in 1982. Because of insufficient power in the past, the Taizhou, Linhai, Wenling, and Sanmen chemical fertilizer plants were unable to operate normally. From January through August of 1983, because power was supplied normally, the productivity of these four chemical fertilizer plants increased by 16.1 percent compared to the same period in 1982. Profits were over 945,000 yuan. Industrial electricity fees were reduced from 0.06 to 0.057 yuan per kilowatt-hour. The Taizhou Chemical Fertilizer Plant uses 16 million kilowatt-hours a year, so in electricity fees alone, 48,000 yuan can be saved.

#### Resolving the Fight Over Electricity Between Industry and Agriculture

In past years, in order to ensure that summer harvesting and planting proceeded smoothly, the big industrial and mining users in the area had to surrender some electric power. Even though all industries gave up some electric power, electricity for agriculture was still not enough. During this period this year, although hot, dry weather was sustained, the electricity for industry and agriculture was fully guaranteed and the phenomenon of vying for electricity did not occur. From January through August this year, the region's agriculture consumed 670,060,000 kilowatt-hours, an increase of 52.24 percent compared to the same period in 1982. Many farmers purchased a great deal of farm machinery as they saw electricity was not a problem.

## Promoting the Development of Commune and Brigade Enterprises

Among the enterprises of the more than 8,800 communes and brigades in Taizhou Prefecture, only a little over 2,000 were electrified in the past due to the shortage of electricity. Dafen Commune, Duqiao District, Linhai County relied on 13 diesel generators to generate electricity for its industry, requiring 20 tons of diesel fuel each season. The cost of energy alone exceeded 62,000 yuan. After Taizhou Power Plant was put on line, electric power has been assured and production has been normalized. In the first half of the year, the industrial products completed by the commune were valued at 1,870,000 yuan, an increase of 18.37 percent compared to the same period last year.

## Saving Large Amounts of Coal and Diesel Fuel

The entire Taizhou area used to have small thermal power plants with an installed capacity of 22,500 kilowatts which consumed 120,000 tons of coal. There were a number of diesel generators also which consumed over 3,000 tons of diesel fuel annually. After the number 1 generator of Taizhou was put on line, these small thermal power plants ceased operating, saving significant amounts of coal and diesel fuel. After Taizhou joined the grid, the small hydroelectric power plants in the Taizhou area became more effective, and their economic benefit improved, creating more favorable conditions to organize rational production.

## Cheaper, Convenient Power for the People

The original small thermal power plants cost 0.25 yuan per kilowatt-hour, with the cost ranging higher in some counties. Now, each kilowatt-hour is only 0.16 yuan. From January through August this year, according to the statistics of six counties and cities such as Linhai, Huangyan, Jiaojiang, Sanmen, and Yuhuan, the electricity cost to people for everyday living was reduced by 3,935,000 yuan. Cheap electricity, on top of an improved standard of living, makes the use of electricity by the people more widespread. Based on statistical information of the Taizhou supply and purchasing station for small manufactured goods alone, 1,537 recorders and 5,097 television sets were sold during the period January through August this year, an increase of 2.1 and 1.1 times respectively compared to the same period in 1982. From January through August, the civilian power consumption of the entire area reached 23,125,000 kilowatt-hours, an increase of 33.6 percent compared to 1982. Yanhai Commune, Jiaojiang City, had been without power for a long time, relying on kerosene lanterns. Nine brigades now have electric power.

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CSO: 4013/35

## POWER NETWORK

### BRIEFS

HEILONGJIANG POWER LINE--A 263-kilometer-long, 220,000-volt high-tension power transmission line from Qiqihar to Beian, Heilongjiang, was completed and put into operation on 6 November. This power transmission line is a subproject of the Fularji No 2 Powerplant, a key state project. [Excerpt] [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 8 Nov 83 SK]

SHAANXI NORTHWEST POWER BASE--Workers of the power departments and affiliated organizations in northwest China have worked hard to build that region into a power resource base for the four power grids of north China, central China, southwest China, and northwest China, and they have achieved gratifying results. At present, the power grid of Shaanxi, Gansu, Ningxia, and Qinghai has become the fifth largest power grid in our country. By the end of 1982, the power grid had an installed capacity of 5.4 million kilowatts and its annual electricity output reached 23.7 billion kilowatt-hours. The Dawukou power plant in Ningxia, the (Qiaotou) power plant in Qinghai, and the Qinling power plant in Shaanxi are under construction. After completion, the Qinling power plant will be the largest thermal power plant in Shaanxi Province. The Ankang hydroelectric power station in Shaanxi is under construction on the Han Jiang and a large dam is being built. It is estimated that this power station, with an installed capacity of 800,000 kilowatts, will be completed before 1990. [Summary] [HK080910 Xian Shaanxi Provincial Service in Mandarin 0500 GMT 5 Nov 83]

HUBEI-HUNAN POWER PROJECTS--The erection of the 220,000-volt high-tension transmission lines and the building of the transformer project from the (Fenghuang Shan) in Wuchang, Hubei Province to Changsha City, Hunan Province, was completed today, ahead of schedule. These projects were built with the approval of the State Planning Commission, were designed by the Hubei and Hunan provincial electric power design institutes, and were built by the Third Department of the Hubei Electric Power Company, the Hunan Electricity Transmission and Transformer Company, and the Xianning Prefectural Electric Power Bureau, Hubei Province. The total length of the lines is 344 kilometers, which pass through Wuchang, Xianning, Puqi, Yueyang, and Changsha. After the completion of these projects, the Hubei and Hunan electric grids will be linked and a complete electricity transmission and transformer network in central China will be effectively set up. [Summary] [Wuhan Hubei Provincial Service in Mandarin 1100 GMT 10 Jan 84 HK]

CSO: 4013/89

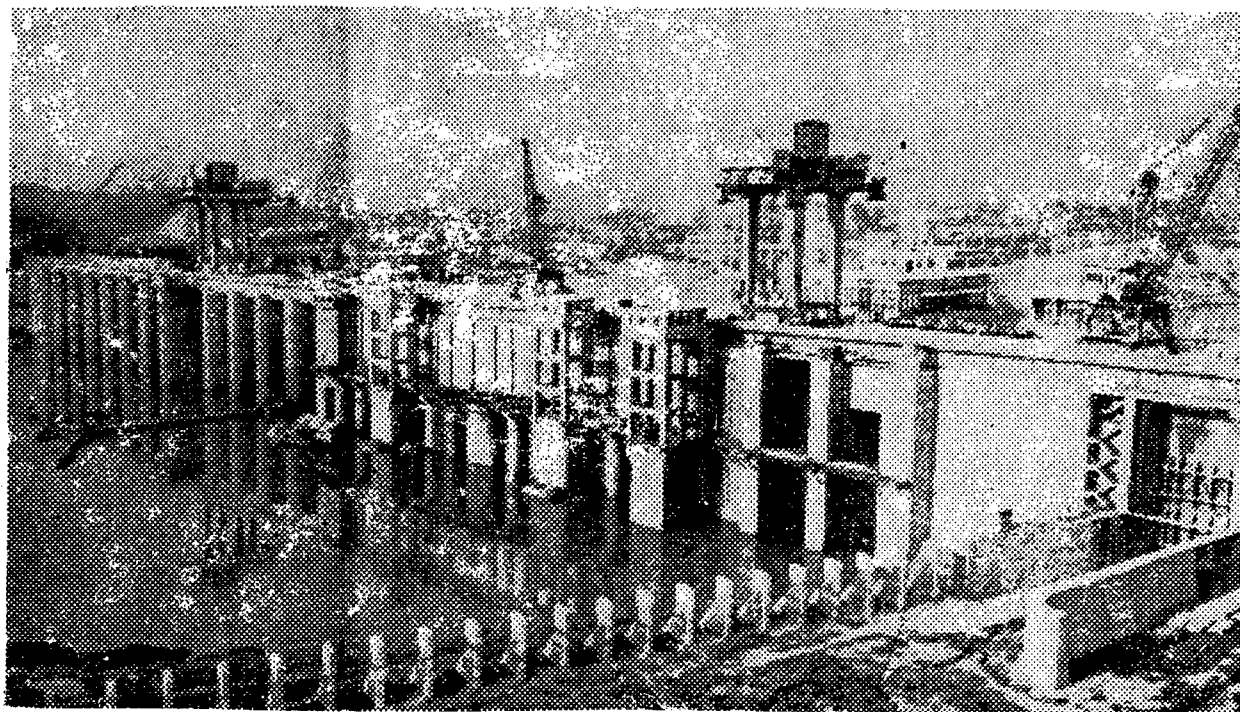


## HYDROPOWER

BASIC CONSTRUCTION ON DAHUA COMPLETED, FIRST UNIT JOINS GRID

Beijing RENMIN RIBAO in Chinese 14 Dec 83 p 1

[Photograph and caption]



The first large-scale hydroelectric power station to be built on the Hongshui He in the Guangxi Zhuangzu Autonomous Region--the Dahua hydropower station--has been basically completed and the No 1 Generator has joined the grid. A key water conservancy project, Dahua will have an installed capacity of 400,000 kilowatts for a yearly output of 2 billion kilowatt-hours.

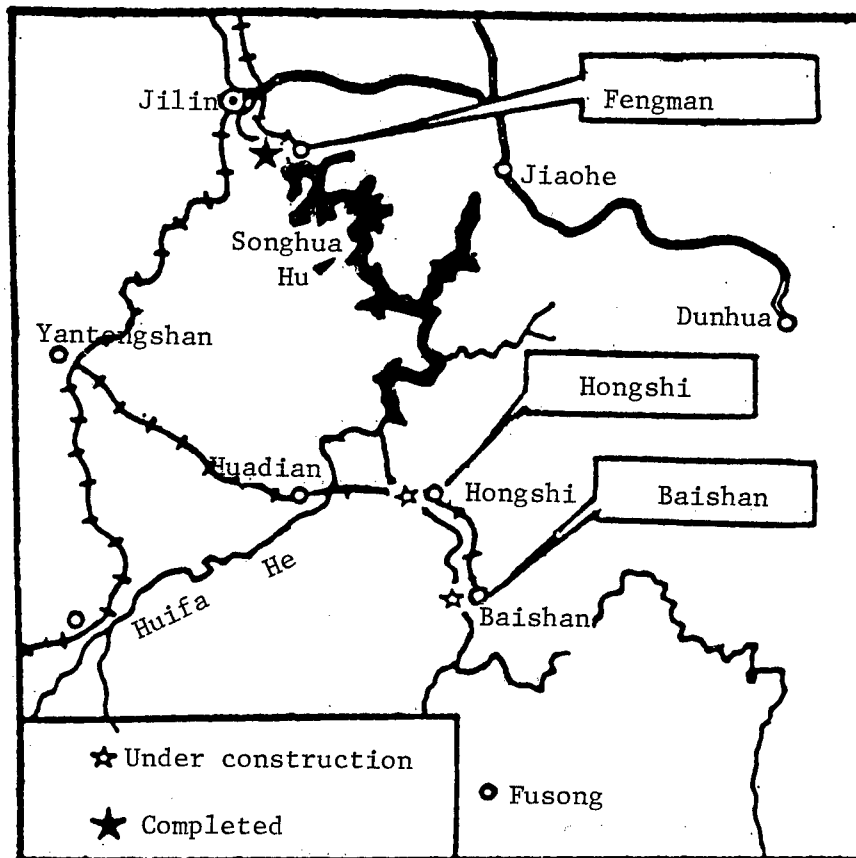
CSO: 4013/71

## HYDROPOWER

### COMPLETED BAISHAN PROJECT WILL BE SECOND ONLY TO GEZHOUBA

Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 10, Oct 83  
pp 11-12

[Summary] The Baishan Hydroelectric Power Station on the Di'er Songhua Jiang in Jilin Province is one of 70 key construction projects in China and is the largest hydropower station in the Northeast. Originating at Baotoushan Tian Chi on the Sino-Korean border, The Di'er Songhua Jiang is 803 kilometers long and its mainstream and tributaries offer some 58 sites suitable for constructing hydropower stations. If developed, the total installed capacity could exceed 3 million kilowatts. A cascade development scheme is planned, although the 554,000-kilowatt Fengman station is the only station on the river to be completed to date. In addition to Baishan, a 200,000-kilowatt station is planned at Hongshi, some 40 kilometers downstream. Located on the upper course of the Di'er Songhua Jiang, Baishan is 250 kilometers with a storage capacity of 5.31 billion cubic meters. The main dam is a concrete gravity-arch dam having a base width of 63.7 meters and a top width of 9 meters; maximum dam height is 149.5 meters. It is the third highest dam in the nation, only Wujiangdu and Longyangxia being taller. Total discharge flow over the dam's four spillways is 8,800 cubic meters a second. Constructed in layers of rock 100 meters deep is the nation's largest underground power station, measuring 148.5X25X54 meters. There are three high-pressure intake tunnels measuring from 7.5 to 8.6 meters in width and from 250 to 311 meters in length and three discharge tunnels with a cross-section of 9.6 X 9.0 meters and lengths ranging from 206 to 259 meters. In this cold climate, the river normally freezes in late November and begins to thaw in early April. Major work on the hydroelectric complex began on 1 May 1975 and as of winter 1982, more than 4.34 million cubic meters of earth and rock had been removed, 96 percent of the total called for in the plan; 1.57 million cubic meters of concrete have been poured, or 70 percent of the total planned. Two domestically manufactured 300,000-kilowatt hydraulic turbine generators were scheduled to begin generating electricity in the latter part of 1983. The Baishan Hydroelectric Power Station has a total design installed capacity of 1.5 million kilowatts, making it second only to Gezhouba in generating capacity. It will add some 2 billion kilowatt-hours of electricity a year to the power-starved northeast.



CSO: 4013/86

## HYDROPOWER

### YANTAN HYDROPOWER STATION PLACED ON 1984 CONSTRUCTION AGENDA

Beijing RENMIN RIBAO in Chinese 13 Jan 84 p 1

[Text] Another large-scale hydroelectric power station on the Hongshui He--Yantan--has recently been approved by the State Council and officially placed on the agenda for 1984 hydropower construction projects. Preparations for construction are already under way. Plans call for work on the main part of the project to begin in 1985 and the first generator is to go on stream in 1993.

The Yantan hydroelectric power station is located on the middle course of the Hongshui He, right on the border of the Bama Yaozu Autonomous Xian and the Du'an Yaozu Autonomous Xian. The installed capacity of the station is 1.1 million kilowatts with an annual output of 5.37 billion kilowatt-hours. When the upstream Longtan and Tianshengqiao stations have been completed, yearly output could reach 8 billion kilowatt-hours. The station will have a main dam 111 meters high and more than 500 meters long with the turbine building, situation below the dam and structures to permit the passage of shipping. The project will bring such benefits as power generation, flood control, and navigation. More than 9 million cubic meters of earth will be moved for the entire project and some 3.2 million cubic meters of concrete poured. Four mixed-flow type hydraulic turbine generators, each with an installed capacity of 275,000 kilowatts, will be installed.

Today, builders are now hard at work on putting in bridges, landings, roads, power, water, and structures for the Yantan project.

CSO: 4013/81

## HYDROPOWER

### LONGYANGXIA AHEAD OF SCHEDULE, 1984 CONSTRUCTION MISSION BEGUN EARLY

Beijing RENMIN RIBAO in Chinese 20 Dec 83 p 2

[Excerpts] The 15,000 personnel working on the main dam of the Longyangxia Hydroelectric Power Station on the upper course of the Huang He have surpassed the 1983 quota to pour 600,000 cubic meters of concrete. They have brought the height of the nation's highest designed dam to 71 meters, and, on the 16th, began the 1984 construction mission ahead of schedule.

A major national construction project, the Longyangxia hydropower station has a design dam height of 177 meters and a reservoir capacity of 24.7 billion cubic meters, the largest [such] reservoir in China. After the station has been built, it will generate 6 million kilowatt-hours of electricity a year to promote the development of Qinghai Province and the great northwest.

Located on the boundary between Gonghe County and Guinan County in Qinghai Province, the Longyangxia hydropower station is 2,600 meters above sea level. Here, in a sandstorm-swept area of cold, rarified air, construction conditions are harsh. In October, after winter construction had begun on Longyangxia, workers endured frigid temperatures of 12 and 13 degrees below zero to actually pour 67,000 cubic meters of concrete as opposed to the original monthly plan of 53,000 cubic meters.

CSO: 4013/67

## HYDROPOWER

### GUIZHOU BUILDS MORE SMALL HYDROPOWER STATIONS

OW121256 Beijing XINHUA in English 0859 GMT 12 Dec 83

[Text] Guiyang, 12 December (XINHUA)--Mountainous Guizhou Province in southwest China built 39 small hydroelectric power stations in 1983, according to the provincial water conservancy department.

Located on the Yunnan-Guizhou plateau, which is rich in water resources, the province now has 4,000 such small power stations with a total generating capacity of 323,600 kilowatts. These small power stations are spread in all counties. They turn out 470 million kilowatt-hours of electricity annually.

About 74 percent of the electricity for county-run industrial and agricultural enterprises is supplied by local small stations.

Electricity is also used in 70 percent of the people's communes to light the multi-national peasant houses, to irrigate and drain land and to process agricultural produce.

The province, with exploitable water power resources of 13.25 million kilowatts, started building small power stations in 1955.

China at present encourages all localities with water resources to construct small hydroelectric power stations, which are described as stations with a generating capacity of less than 12,000 kilowatts. Nationwide there are now more than 80,000 such power stations.

CSO: 4010/22

## HYDROPOWER

### TAIPINGWAN INTERCEPTS FLOW OF RIVER

Shenyang LIAONING RIBAO in Chinese 7 Oct 83 p 1

[Article by Ma Gengling [7456 1649 0109]: "New Chapter in Sino-Korean Friendship, Taipingwan Hydroelectric Power Station Successfully Intercepts Flow"]

[Text] On the afternoon of 6 October, the fourth medium-sized power station to be jointly invested in by China and Korea--the Taipingwan Hydroelectric Power Station on the Yalu River--successfully realized the interception of the flow of the river.

Reflecting the friendship between Korea and China, this hydroelectric project, with the support of Korean leading organizations and people and the struggle of 10,000 personnel of the 6th Engineering Bureau of the Ministry of Water Resources, the major engineering work on both banks took only a year or so. The river, which has a maximum rate of flow of 4.1 meters/second at its center has now been blocked, assuring an early completion of the power station. At 2:30 pm, as a score of heavy trucks dumped large amounts of rock and gravel into the river, gradually narrowing and finally blocking the flow, fireworks erupted on both banks. The hydroelectric construction workers danced for joy and both Chinese and Korean comrades applauded enthusiastically, shaking hands to congratulate each other. The Chinese Chairman of the Board of Directors of the China-Korea Yalu Jiang Hydroelectric Power Corporation, Vice Minister of Water Resources and Electric Power Li Daigeng, the Korean Chairman, Vice Minister of Power Industry Yi Chungsong, Deputy Governor of Liaoning Province Peng Xiangsong [1756 4382 2646], Party Secretary of the Bureau of Water Resources and Hydropower Construction Liu Shudian [0491 2579 3944] and the leading comrades of the city government of Dandong were present to observe the closing of the river and to attend the celebration to honor the event.

12553  
CSO: 4013/35

## HYDROPOWER

### BRIEFS

LUBUGE UPDATE--Work on Yunnan's largest hydroelectric power station, Lubuge, is now being intensified. One of the key construction projects under the Sixth Five-Year Plan, Lubuge is now in the final construction preparation stage. The Lubuge hydroelectric power station is situated in a mountain gorge on the lower course of the Huangni He. Here, the water flows in a torrent--the mean volume of flow is 164 cubic meters a second--and the site is a ideal spot to build a hydroelectric power station. Hydropower workers will build a dam 101 meters high here, as well as a power tunnel some 9 kilometers in length, and then install four hydraulic turbines. The design installed capacity of this power station is 600,000 kilowatts capable of generating 2.9 billion kilowatt-hours a year on average. Plans call for the stream to be blocked in 1985 with power being generated in 1989. Most of the electricity generated will be transmitted to the two provinces of Yunnan and Guizhou. The project should play a major role in promoting industrial and agricultural production in the region. [Text] [Kunming YUNNAN RIBAO in Chinese 22 Nov 83 p 4]

DAHUA UPDATE--The No 1 generator [100,000 kilowatts] of the Dahua Hydroelectric Power Station, the first large-scale station of the cascade power projects on the Hongshui He in the Guangxi Zhuangzu Autonomous Prefecture, officially joined the grid on 1 December 1983. After 2 weeks, operations were proceeding normally. Begun in 1975, the Dahua Hydroelectric Power Station is being built primarily to generate electricity but has the added benefits of enhancing shipping and irrigation. [Text] [Beijing RENMIN RIBAO in Chinese 20 Dec 83 p 2]

MIN RIVER VALLEY PLAN APPROVED--On 10 December, the State Planning Commission formally approved Fujian Province's "Min Jiang River Valley Plan." The Min is the largest river in Fujian Province and the plan for its comprehensive development and utilization will have a major impact on the economic growth of the province. Following joint studies, the State Planning Commission and the Ministry of Water Resources and Electric Power, the Ministry of Agriculture, Animal Husbandry and Fisheries, the Ministry of Communications, the Ministry of Forestry, and the Ministry of Urban and Rural Construction and Environmental Protection have decided to make the comprehensive development and utilization of the Min Jiang a national land planning pilot project. Fujian Province has been requested to organize a "Seventh Five-Year Plan" feasibility study on the major projects and to accelerate early-phase work. [Text] [Fuzhou FUJIAN RIBAO in Chinese 20 Dec 83 p 1]



TANKENG SURVEY BEGUN--Recently, the Second Geological Survey Team of the Huadong Survey and Design Academy, Ministry of Water Resources and Electric Power, undertook a geological survey of the dam site of the Tankeng hydropower station on the Tankeng section of the Xiao Xi, a tributary of the Ou Jiang, and will take core samples from the river. The Tankeng hydropower station project is a major one for the development of the Ou Jiang system and plans call for an installed capacity of 600,000 kilowatts. The State Planning Commission has already included Tankeng on the agenda for major construction projects and wants preliminary work to be done during the period of the "Sixth Five-Year Plan." [Text] [Hangzhou ZHEJIANG RIBAO in Chinese 19 Dec 93 p 2]

BAISHAN 300MW GENERATOR--Changchun, 31 December (XINHUA)--A 300,000-kilowatt generating unit, the first installed in a large hydroelectric power station in northeast China, went on line Friday. The air-cooled water turbine generator, the largest of its kind in China, is one of three to be installed during the first phase of construction at the Baishan power station on the upper reaches of the Songhua Jiang in Jilin Province. The 1.5-million kilowatt plant will be the largest in northeast China. The new facility is expected to alleviate power shortages in the area, officials said. [Text] [Beijing XINHUA in English 1156 GMT 31 Dec 83 OW]

ANKANG BLOCKS RIVER--At 11:30 am on 25 December, one of the nation's major construction projects--the Ankang Hydroelectric Power Station in Shaanxi Province--blocked the flow of the Han Jiang, sending its water cascading into an open diversion canal on the river's left bank. Only an hour and a quarter passed from the time the blocking began until the time it was completed. The Ankang Hydroelectric Power Station is located near the city of Ankang on the upper course of the Han Jiang and has a total design installed capacity of 800,000 kilowatts. The successful blocking of the river heralds the beginning of major construction work on the bed of the river and the launching of a new phase of work. [Text] [Shijia-Zhuang HEBEI RIBAO in Chinese 27 Dec 83 p 4]

NANYA HE UPDATE--On 30 December 1983, the No 1 unit of the Nanya He Third Cascade Hydroelectric Power Station began generating power ahead of schedule, realizing the plan to have all three of the station's units operational in 1983. The Nanya He Third Cascade power station is located in Shimian Xian, Sichuan Province and is a water diversion and electric power project on the Nanya He, a tributary of the Dadu He. It has an installed capacity of 120,000 kilowatts and was a major 1983 construction item for Sichuan. The No 2 unit and the No 3 unit joined the grid in March and September 1983 respectively. [Text] [Chengdu SICHUAN RIBAO in Chinese 3 Jan 84 p 1]

CSO: 4013/83

## THERMAL POWER

### EXPANSION OF YONGAN POWER PLANT ENTERS THIRD PHASE

Fuzhou FUJIAN RIBAO in Chinese 18 Sep 83 p 1

/Report by Zhu Wenxiang /2612 2429 4382/: "Yongan Thermal Power Plant Expansion Project Going Smoothly; The Huge Smokestack and Main Plant Building Completed; Project Now Entering Construction Phase and Installation of Huge No 5 Boiler Hoist Is Completed Ahead of Schedule"/

/Text/ One of the backbone construction projects in Fujian, the third-phase expansion of the Yongan Thermal Power Plant is moving steadily toward the installation stage. The first campaign in the installation--the huge hoist for the No 5 boiler--has been completed 11 days ahead of schedule.

The third-phase expansion of the Yongan Thermal Power Plant will involve the installation of two 100 MW generators. After the project has been completed, the current total installed capacity of 150 MW will be expanded to 350 MW. Since this project was formally launched in July 1981, the provincial government and support of related departments, the cadres and employees of the Yongan Thermal Power Plant and over a dozen construction units, including the Provincial First Construction Co, the Provincial Electric Power Construction Co, the No 3 Engineering Department of the Provincial Highway Department, etc., have united as one, and have divided the work and cooperated with each other, to continually accelerate construction. The amount of investments completed by the end of August was 83 percent of the annual plan.

The 180-meter smokestack, the tallest in the province, has now been completed; expansion of the main plant building, the boiler frame and a portion of the equipment has been basically completed. Two items requiring more work, the coal-unloading chute and the water intake head, are now under intense construction. The main generator, backup generator, and much of the other equipment have already been shipped to the site, and some are being uncrated and checked, and layout of part of the control room has begun. There will be a high tide of installation work at the end of this year.

Work involving 30 million yuan of the approximate total of 100 million in investments in this construction project can be completed by year's end, which greatly exceeds the annual plan. Based on present construction progress forecasts, it is possible that the first 100 MW generator can begin trial operations on schedule in October 1984.

## THERMAL POWER

### BRIEFS

SHILIQUAN PLANT COMPLETED--The No 5 generator of Shandong's Shiliquan Power Plant, the largest power plant in Shandong has officially joined the grid and began to generate electricity today. This large-scale thermal power plant, with its five 125,000-kilowatt double water-cooled generators, has now been completed. The Shiliquan Power Plant is located in the Zaozhuang mining area in southern Shandong Province. It is a large-scale pit-mouth power plant. Here, the coal resources are abundant, the water resources are sufficient, and the nearby mountain valleys and ravines offer a natural disposal for ash and residue. The completion and entry into production of the Shandong Shiliquan Power Plant will play an important role in changing the situation of shortage of electricity for use in industrial and agricultural production in the northeast China region, in particular for use in the acceleration of key construction projects throughout the country--the development of the Yan-Teng coal fields and the construction of Shijiu Port. [Text] [Lanzhou GANSU RIBAO in Chinese 19 Oct 83 p 3] 9335

JINZHOU NO 2 UNIT OPERATIONAL--Shenyang, 9 December (XINHUA)--The No 2 generating unit at a big thermal power plant being built at Jinzhou, Liaoning Province, has gone into operation. The Jinzhou power plant is one of the 70 key projects now under construction in China. Upon completion, it will have six generating units with a total capacity of 1.2 million kilowatts. Construction started in June 1979 and the first generating unit began producing electricity in January this year. The local government tried to speed construction of the second generating unit by giving the plant priority with regard to materials, manpower and transport facilities. Construction of the second unit took only 234 days and began operation in 218 days less than the first. The two generating units will produce 2,880 million kilowatt-hours of electricity a year and play an important role in alleviating the power shortage in Liaoning Province and northeast China as a whole. Preparation for the installation of the third generating unit is now under way. [Text] [OW091101 Beijing XINHUA in English 0822 GMT 9 Dec 83]

DOUHE THIRD PHASE CONSTRUCTION--Tangshan, 27 December (XINHUA)--North China, including Beijing and Tianjin, is on line for more electricity following the inauguration of a new 200-megawatt generating unit in the region's largest thermal power plant. The generator, which was switched on today, is one of the two to be installed during the thrid-phase construction of the Douhe thermal power plant, near the north China industrial city of Tangshan. Four units with total generating capacity of 750 megawatts installed in the first two phases of construction went into operation in 1978. Construction of the plant began in December 1973. The major equipment and operation of the plant are computerized. Most of the equipment installed in the first two stages of construction was imported. The generators and other major facilities to be installed in the third and later stages will all be domestically manufactured. The sixth 200-megawatt generator is expected to go on line before the end of next year. When completed, the 1,550-megawatt plant will produce more than 10 billion kilowatt-hours of electricity a year. [Text] [OW271146 Beijing XINHUA in English 1123 GMT 27 Dec 83]

CSO: 4010/29

## COAL

### COAL TRANSPORTATION, POWER TRANSMISSION IN SHANXI BASE ANALYZED

Beijing NENG YUAN [JOURNAL OF ENERGY] in Chinese No 4, 25 Aug 83, pp 1-3,17

[Article by Hu Benzhe [5170 2609 0772]: "Study on Methods of Coal Transportation in Shanxi Energy Base"]

[Text] The transportation of energy is not only the link between energy developers and consumers but also a prerequisite to developing and utilizing energy, and has a direct bearing on the economic effectiveness of its development and utilization. Selection of the methods of energy transportation is extremely important to energy development and the entire national economy.

Shanxi Province is an important coal base in China. A huge volume of the coal is shipped out of the base area, about 73 million tons in 1980. As annual production grows, the volume of coal to be shipped out will also increase steadily. How to make the coal available to provinces and cities in need of it is not only a matter of transportation but also has a bearing on the building up of the Shanxi coal base and the development and rational utilization of coal resources in the base area. How the matter is handled will have an enormous impact on the building up of the Shanxi coal base and the national economic development.

#### I. Analysis of the Techno-economic Effectiveness of Power Transmission and Coal Transportation

There are generally three modes of coal transportation: railroads, pipelines (including the transportation of liquefied and gasified coal and coal slurry), and high-voltage transmission (direct and alternating current). Each is unique. It is a complicated technical and economic problem to determine which is the most rational and economical mode. Different specific conditions lead to vastly different techno-economic results and it is necessary to make specific analyses.

The current situation in Shanxi: The volume of coal to be shipped out is huge while rail transport capacity is limited. The province's rail transport capacity is about 97 million tons. In 1980 coal transport accounted for 83 percent of this capacity, yet 10 million tons of coal could not be shipped out. Goods and materials other than coal require 33.8 percent of

the transportation capacity but at present are allotted only 17 percent. This is a serious problem in Shanxi's economic development and as the coal base develops, this problem will become even more serious.

Below is a techno-economic analysis of the three types of energy transportation methods: rail, pipeline, and high-voltage power transmission.

1. Rail transportation. Based on the analysis above, if the close to 100 million tons of coal are to be shipped out of Shanxi by rail, it is necessary to build new rail lines. This would involve an enormous amount of work since the terrain in Shanxi is mountainous and the geological conditions are complex. It will also involve a great amount of dismantling and moving work. All this would result in high unit cost. For example, the unit cost of the Taiyuan-Lanxian line is 3.7 million yuan/km., that of the Taiyuan-Jiaozuo line, 2.49 million yuan/km. The cost of double-tracking plus electrification of the section between Shijiazhuang and the Saiyu District of Yangquan is 4.167 million yuan/km. Construction would take 6 years, huge tracts of land would be taken up, and large investments would be required.

2. Transportation of coal. First of all, China does not have industrial experimental data on pipeline transportation of coal, and practical difficulties exist in the construction of large-scale pipelines for transporting coal. Management is also a problem. Actual experience in management in various countries shows that problems also exist in the technology itself, such as complicated dehydrating installations and difficulties in discharging coal slurry. Coal is transported can only be supplied to fixed points, which makes it a not very flexible method.

3. High-voltage power transmission. This involves constructing pit-mouth power stations of the coal base and transmitting coal energy to consumption centers in the form of high-voltage electrical power. Construction of high-voltage transmission lines takes up relatively little land; power stations built near mines will facilitate the utilization of poor-quality coal and the disposal of ash. The great distances between the power stations and the urban load centers also makes environmental protection easier to handle. Of course, high-voltage transmission of electrical power requires high water consumption. Compared with the use of water in railroad and pipeline coal transportation, the ratio is 3:2:1.

We will now use concrete examples to make a comparison between high-voltage power transmission--the four planned or being constructed pit-mouth power plants at Datong and Shentou which will have a total installed capacity of 6.15 million kw burning flat plastic coal to generate electricity to be transmitted to the Beijing-Tianjin area--and transporting coal by rail and pipeline to the same area where four power stations of the same installed capacity will be built. The techno-economic indicators are as follows.

(1) High-voltage power transmission. Using 500 kv voltage and outlets to 6 loop lines, with an average transmission distance of 320 kilometers, and equipped with corresponding intermediate switching stations and terminal compensators.

(2) Transporting coal by railroad. Using steam locomotives to haul flat plastic coal on double tracks to power stations in the vicinity of Beijing and Tianjin. Transport capacity is 30 million tons/yr., and annual volume of coal hauled 23.37 million tons. The calorific value of the coal is 4,345 Kcal/kg.

(3) Transporting coal by pipeline. Using 1,420 x 14 pipelines with a flow speed of 1.65 m/sec. The total length of the pipeline is 540 kilometers, the annual volume of coal slurry transported 46.74 million tons (coal-water ratio 1:1), equipped with corresponding intermediate booster pump stations, roads, and power supply and communications facilities.

(4) The table below gives an economic comparison between high-voltage power transmission and the other two modes of coal transportation.

Techno-Economic Comparison Between High-Voltage Power Transmission and Coal Transportation by Rail and Pipeline

<u>Items</u>	<u>High-voltage transmission</u>	<u>Railroad Transportation</u>	<u>Pipeline Transportation</u>
Capital investment (10,000 yuan)	9.68	14.23	7.21
Rolled steel consumption (10,000 tons)	12.67	12.61	27.23
Energy consumption (standard coal, 10,000 t/y)	36.23	43.52	29.01
Operating cost (10,000 yuan)	0.56	1.29	0.76
Cost (yuan/ton coal)	2.40	5.51	3.26
Land used (10,000 mu)	0.15	3.05	1.21

The above comparison shows that the cost of coal transportation by rail is relatively high and that by pipeline less expensive, but that situation may be reversed if major overhaul of pipelines is required after 10 years. Also, the technology of transporting coal by pipeline is still being studied in China and practical data are lacking. The data of foreign countries may not be entirely applicable to Chinese conditions. The indexes in the above table are estimates.

For further clarification, we present the following supplementary information.

1) The alignments and lengths of railroads are different from those of power transmission lines. The former are longer and more difficult. The latter are basically straight and shorter. It is more difficult for railroads than for transmission lines to traverse such terrain as plains, rivers, hills, and high mountains, as railroads involve immense amounts of engineering work, long construction time, high costs, and huge investments.

The length and degree of difficulty of pipeline runs are somewhere between railroads and transmission lines. In addition to roads, power supply and communications lines, and substations along the pipelines, it is also necessary to set up booster pump stations, facilities for maintenance, inspection and repairs, and living quarters every 40 kilometers or so along the pipelines. Also, a great amount of difficult engineering is involved in building tunnels and bridges in order to lay pipelines across high mountains and rivers.

2) Unlike power transmission lines, railroads and pipelines will take up and disrupt huge areas of land, about 50 percent of which is cultivated land. The land occupied will amount to 30 times that required for high-voltage power transmission, and eight times that for pipelines (land used in pipeline coal transportation is mainly for building roads).

3) The biggest advantage of rail transportation is its two-way traffic suited for multipurpose transportation, which will promote economic growth along the railroads. In Shanxi Province, since the volume of outbound shipping is huge, the ratio of returned empty cars can reach 6:1. The power consumption and transport cost of returning the empties are considerable. Power consumption of rail transportation, for example, accounts for 3-4 percent of transportation energy (not including consumption in the form of transport cost), and coal loss during transportation accounts for roughly 3 percent. The sum of the two losses is larger than power transmission line loss.

4) The advantage of pipeline coal transportation is its large volume, suited for long-distance movement. At full-load operation, efficiency is high and power consumption relatively low, accounting for only 2-3 percent of the energy transported through the pipelines. But coal transported through pipelines can only be supplied to fixed points, and pipelines must be constructed as a component part of an entity that includes coal mines and power plants. If the construction of coal mines and power plants cannot be synchronized with that of coal pipelines, that is, if pipelines are completed when coal mines and power plants are still in various stages of construction, then the pipelines will be operating at low-load for a long time. This will result in inefficient operation and great economic losses. High-voltage power transmission and rail transportation will not have this problem.

5) Since Shanxi Province's ability to wash coal is currently low, the coal shipped out is mostly raw coal, with high ash content. Calculated at an average of 25 percent, losses from railroad transportation costs due to wasted operations will exceed 10 million yuan a year.

6) Capital investment in large-capacity power plants in the eighties is different from the small-capacity power plants built around the sixties in that it is no longer determined purely by the mode of fuel transmission. It will depend to a large extent on the natural conditions surrounding the plant site and the condition of the resources. Because future plants will be on a large scale, there is a qualitative change in the conditions of



construction. For example, considerable investments will be needed in environmental protection and ash storage, to the extent that they may determine if the construction of a plant is justified. Therefore, in making economic comparisons between power transmission and coal transportation, one must also consider investment increases resulting from changed construction conditions.

7) In the economic comparison, investment in high-voltage power transmission includes 500-kv transmission lines, intermediate switching stations and terminal compensators. The capacity and investment of these facilities are basically in direct ratio with the capacity and distance of the power transmitted. The unit cost per kilometer, therefore, except for terrain factors, is relatively stable. The energy consumption in power transmission is also in direct ratio with the distance transmitted, i.e., the larger the transmission capacity, the larger the power loss.

Investment in railroad transportation includes line tracks, station buildings, locomotives, cars, and facilities for reconstructed junctions arising therefrom. The facilities and investments will vary according to the transportation capacity and distance. But since investment in coal transportation is made in shares according to railroad transportation capacity, investment in unit ton coal will not vary greatly.

Investment in pipeline transportation includes crushing and slurry-making, pipelines, pump stations, highways, facilities for power supply, communications, dehydration and drying, and coal yards.

The facilities and investment will vary according to the volume and distance of coal transported.

It is easy to see from the above comparison that it is more economical and more rational to construct pit-mouth power plants and transmit high-voltage power to load centers.

## II. The Possibility of Constructing Pit-Mouth Power Plants in the Shanxi Energy Base

The Shanxi energy base is rich in resources and is centrally located. It produces about one-half of the nation's coal used for generating power and is therefore in a good position to construct pit-mouth power plants and develop large-scale power grid systems. A plant construction proposal with suitable conditions regarding plant sites, fuel, water source, transportation, outlets, ash yards, and environmental protection can produce a total installed capacity of 35 million kilowatts.

(1) Rich resources. Coalfields in Shanxi cover an area of 57,000 square kilometers, occupying 36 percent of the province's total area. It has a complete range of coal types, a large number of which are suited for generating power. Viewed techno-economically, since Shanxi's coal for generating power has high ash content, high volatility and low calorific value, it is economically rational to burn the coal on the spot for electricity.

(2) Water for power stations is ensured. Water resources in Shanxi Province total 17.18 billion cubic meters, of which 11.68 billion cubic meters is surface water and 5.5 billion cubic meters underground water. Currently industry and agriculture are using 6.409 billion cubic meters, accounting for 37 percent of the resources. Annual flow of water to outside the province is 8.2 billion cubic meters, about 48 percent. This shows that there is a great potential of water resources for industrial use, enough to guarantee water supply for the coal energy base and pithead power stations.

(3) Centrally located geographically, with fairly short transmission distances. Shanxi is centrally located in relation to load centers--industrial cities in the country's northern, eastern, central and northwestern regions. Such cities as Beijing, Tianjin, Tangshan, Shijiazhuang, Handan, Jinan, Zhengzhou, Xi'an, Luoyang, Hohhot and Baotou are all about 300 kilometers away as the crow flies, and all within economic 500-kv high-voltage transmission distance.

(4) Convenient transportation. According to the plan for the Shanxi thermoelectric base and the layout of power sources, pithead power stations are all situated within the coal base and transportation by both rail and road is convenient. Most power source points are less than 10 kilometers from the coal mines and coal can be transported either by special direct rail lines or long-distance conveyor belts. There will be no need to go through trunk state railroads, hence little interference. This will release rail transport capacity to ship coal to outside the province.

(5) Favors environmental protection. Pithead power stations will be located within the coal base, which is a class-3 environmental protection region, with wide open spaces and sparse population far from the big cities. It thus favors environmental protection and will need far less investment to protect the environment than if the power stations were built in big cities or load centers.

(6) Easy access to land for storing ash. The power stations will be located within the mining areas where the land, dissected by numerous gullies, is cheap and not considered good farmland. It therefore involves little dismantling and moving and less compensation paid. Wasteland, saline and alkaline land, and pithead roadways can be fully utilized for storing ash which in turn can be used to improve the saline and alkaline land, and low-lying land and to refill roadways, a double benefit measure.

The above analysis fully shows that it is far better to utilize conditions within the coal base and build a number of pit-mouth power plants than to ship the coal to big cities or load centers and build power stations there. The base has exceptional advantages for building these plants. Shanxi now uses 9 million tons of coal to generate electricity, accounting for 8 percent of the coal produced in the province. It ranks eighth in the nation in total installed capacity, which is 2.52 million kilowatts, roughly 4 percent of the nation's total. This installed capacity falls far short of the needs of current industrial and agricultural production in the province, and cannot begin to meet the demands of further development of the coal

base. In the country as a whole, power generated by pit-mouth plants accounts for 22 percent of the total power production, compared with over 35 percent in the United States, 47 percent in West Germany, 60 percent in the German Democratic Republic, 38.7 percent in Australia, and 31 percent in Poland. It is absolutely necessary to utilize the favorable conditions in Shanxi province to construct a good number of pithead power stations.

### III. Conception of Coal Transportation in the Shanxi Coal Base

Based on the conditions of Shanxi Province's coal resources and railroad transportation and future development programs, we put forth the following conception on coal transportation in the base area.

1. In view of the fact that current railroad transportation capacity falls far short of demand, that while coal production in Shanxi is rapidly increasing, coal washing capacity is still limited, and that practical experience in pipeline coal transportation is still lacking, priority should be given to building a large number of pit-mouth power plants (including air-cooled plants) in the province to convert coal, which is a primary energy source, into electricity, a secondary energy, and transmit the electricity to such industrial cities and load centers as Beijing, Tianjin, and Tangshan to contribute toward the establishment of a north China grid system and a national grid system.
2. While stepping up the construction of pit-mouth power plants, reconstruct existing railroads and build some new trunk lines, with emphasis on the former, and work for electrification of the railroads as much as possible in order to increase transportation capacity.
3. In a nutshell, in selecting a mode of energy transportation for the Shanxi energy base in the Sixth Five-Year Plan and the 10-year plan conception, priority should be given to pit-mouth power plants and grid system development, increasing the proportion of coal used to account for 30 percent of the coal produced in the province. Second priority should be given to the construction of railroads, with emphasis on reconstruction and gradual electrification of the lines. As for pipeline transportation of coal, experiments should be conducted first. This overall arrangement is more reliable, practical, rational, and economical.

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CSO: 4013/11

## COAL

### COAL CONFERENCE STRESSES IMPORTANCE OF SCIENCE AND TECHNOLOGY

Beijing MEITAN KEXUE [COAL SCIENCE AND TECHNOLOGY] in Chinese No 8, 25 Aug 83, pp 2-5

[Article by Editorial Department: "Relying on Progress in Science and Technology To Double Coal Output"]

[Text] Recently the Ministry of Coal Industry convened the Second National Conference of Coal Science and Technology. State Councilor Fang Yi attended the conference and gave important instructions. Minister Gao Yangwen delivered a report entitled "Relying on Progress in Science and Technology, creating a New Phase, and Doubling Coal Output." At the conference, awards were presented to 68 outstanding achievements in sciences and technology and 56 outstanding professional and technical cadres. Twenty-one units and individuals spoke about their work experience. This was an important conference in effecting a shift in guiding thinking. The conference called on the staff and workers, in particular the leading cadres at all levels, to earnestly shift to the idea of relying on progress in science and technology to pull the coal industry out of backwardness and double its output.

Relying on scientific and technological progress to invigorate the economy is a major strategic decision of the party Central Committee. The first thing that must be done in order to quadruple China's total industrial and agricultural output value is to double coal output. And a host of problems need to be solved in order to increase coal output from 600 million tons in 1981 to 1.2 billion tons in the year 2000. The problems include sources of funds, speed of capital construction, transportation and backwardness in technology and operations management. How to solve these problems? Are we sure we can double coal output? When discussing whether we can achieve the strategic objective of quadrupling total industrial and agricultural output value by the year 2000, Premier Zhao Ziyang made an in-depth exposition of an important idea: If we do not rely on scientific and technological progress, we may well fail to achieve the objective. If we do, we can be sure of bringing the objective to fruition. This idea is particularly important in guiding the development of the coal industry.

For some time, China's coal science and technology has lagged behind not only the world's major coal-producing countries but also other industries in China. No doubt it was a tremendous achievement to produce 600 million tons of coal

when we were backward in science and technology. The speed of development, in particular, was rare in the world. This was achieved through hard work by the workers, technical personnel and leading cadres on the coal front under the leadership of the party. But we must also take note that this was achieved at great cost, seen especially in the use of huge work forces, low efficiency, great waste, heavy casualties and poor economic results. This cost has become such a heavy burden that each step forward has been a tremendous effort. In recent years more and more comrades on the coal front have come to feel deeply that we must rely on scientific and technological progress if the coal industry is to throw off its backwardness and achieve 1.2 billion tons.

Still, a considerable number of our comrades lack an in-depth understanding of this point. They maintain that we have been producing coal all these years even though we did not particularly stress science and technology. We say this view is incorrect. It is not consistent with past reality, or with the trend of development in the coal industry, or with the laws of social development. Social development cannot be separated from science and technology, nor can mass industrial production. Without appropriate science and technology, we would not have been able to produce 600 million tons of coal. In the fifties and early sixties, the party and the state paid great attention to the development of science and technology. So did comrades engaged in coal production. At the time, many key coal mines reformed the plundering style of mining methods left over from the old society and set up the longwall mining system and developed the techniques of comprehensive mining and pit prop substitutes. The gap between Chinese and foreign technologies at the time was not yet great. Later, under the influence of "leftist" errors, the disruption of the 10-year turmoil, and held back by the force of habit of small-scale production, the gap widened. In recent years we have devoted special efforts to developing comprehensive mining and high-grade general extraction, instituted technical reforms in mining technology, and made progress in the study of such technologies as "three downs" extraction and special shaft sinking. Without these reforms we could not have produced 600 million tons. It is true, as pointed out above, that we have produced 600 million tons on the basis of backward science and technology, and inevitably at great cost. If due to various reasons such great cost could not be helped in the past, there is no reason to rest content with this state of affairs in the future. The old road is impassable now. The only way out for the coal industry is to make progress in science and technology.

Some comrades hold that since China has a huge population, it is only right that we use large work forces. This is a lopsided view. It is true that in view of the present situation in the coal industry, it would be difficult to double output without expanding the work force somewhat. A series of problems will be created, however, if, as in the past, we double the work force for the purpose of doubling output. Throughout China there are already several million coal workers and staff. Adding to this number the family members puts the coal population at over 10 million. Each colliery is a small society in itself. Everything, from production to everyday life, from birth to death, needs to be taken care of, and this takes up a great deal of the leading cadres' time and energy. Because of the great numbers of people, each person will receive very little of the limited money accumulated by the collieries through hard work, which includes the profit or loss cut retained. This means it will be diffi-

cult to improve benefits for the workers and their families. If the work force is to be doubled, who will pick up the extra burden? The coal industry is moving from labor-intensive to technology-intensive production. A good many mechanized mines are already technology-intensive enterprises. Space is limited at extraction and excavation work faces and there is always the element of danger so we should avoid the use of a great number of people. When accidents happen, a lot of people mean heavy casualties. When there are more people, management will be difficult and the accident factors will increase correspondingly. So from the viewpoint of safety, it is also necessary to quickly effect a shift in guiding thinking. When production increase depends on increasing the work force, it would be hard to raise labor efficiency, and economic results would be poor. China's current full-attendance work efficiency is much lower than that of the world's major coal-producing countries, a concentrated expression of the backwardness of its coal science and technology, education and management. Therefore, the policy of relying on science and technology, raising labor efficiency and using minimal work force is consistent with China's coal mining realities.

Some comrades cling to the idea that blast-hole mining is more reliable, regarding it as a "conventional weapon" they are accustomed to and which they find easy to manage, so they are content with lagging behind and never think of changes. This heavily conservative thinking was reflected in the debates, held a few years ago, over whether to develop multi-method mining, to make technical reforms, to develop extensive opencut mines by using new technological processes, techniques, and equipment, to adopt advanced and safe technical installations. Unless this mental attitude is changed and the old ideas are done away with, no new situation will appear. Our strategic objective is to double output and we cannot achieve it by relying on existing technical equipment. To ensure achieving the objective, we must make the development of large opencut mines a strategic priority. The decisive factor in developing large opencut mines is the use of large high-efficiency equipment. Backward technological processes, small power shovels and other small equipment as used in the past cannot do the job. It is the same with shaft mines. Sinking a shaft mine with existing construction equipment and technology would take 8 or 9 years (of course the problems also include leadership, management and external conditions), and the construction of a 10 million-ton colliery will take 20 years. Future shaft mines will be designed to produce 20 million tons a year, the shafts will be larger and increasingly deeper, and more special excavation technologies will be required. We will never be able to construct a mine with 20 million-ton annual capacity by using old technological processes and technical equipment. Increases in coal output can only be realized through technical reforms, developing step by step and in a planned way comprehensive mining, concentrating efforts on high-quality general mining and general mining, implementing rational concentrated production, and constantly raising unit workface yield and extraction area yield rather than relying solely on increasing the number of excavation workfaces. Doing the latter would mean increased volumes of transportation, management and tunneling. Statistics for the first 6 months of 1983 show that the average unit yield of comprehensive mining workfaces was 2.11 and 2.78 times higher than that of general and blast-hole mining respectively. The average unit yield of high-quality general mining is 42.1 percent and 78.3 percent higher than that of general and blast-hole mining respectively.

In a word, past experience and future development both indicate that technical innovation of the coal industry must be carried out comprehensively and throughout the system, not just for individual projects or a single aspect. Without progress in science and technology, there will be no high speed. Only through progress in science and technology can the coal industry effect the "five shifts" and blaze a new path of "stable speed, sound development, safe production and construction, and good economic results," achieving a qualitative change and modernization. Therefore, effecting a strategic shift of guiding thinking is the demand of the times, a historical mission.

How to achieve the shift?

First, implement the guiding ideas of "reliance" and "orientation." Reliance means relying on progress in science and technology. This should be the guiding idea in developing the coal industry and doing a good job of coal production and construction. Orientation means orienting toward the realities of coal production and construction. This should be the guiding idea of scientific and technological work.

Production and construction units should pay particular attention to "reliance." The main problem currently in the production and construction units is a lack of inherent motivation in relying on the progress of science and technology to develop production. We should kindle in the workers and staff a willingness and a sense of responsibility to develop science and technology, a mental attitude of daring to innovate and break new ground. At the same time, the advanced or backward nature of science and technology, the size of work forces, the level of gains or losses, the speed of mine construction, the results of investments--all this must be linked to the economic interest of the enterprise and the workers. A certain degree of external pressure, in the form of intervention through planning and administrative measures, should be exerted to urge the enterprises to adopt advanced science and technology. Leading cadres in production and construction units must truly give priority to scientific and technological work, regularly handing down tasks to scientific and technological departments, creating conditions for scientific and technological work, and paving the way for the application of research results to production and construction. Each unit should draw up its scientific and technological development plan and technical reform plan on the basis of the soon-to-be finalized Technical Policies of the Coal Industry and the Development Plan of Coal Science and Technology. Each unit should actively popularize new technologies, processes and equipment suited to itself, making "50 advanced techniques and experiences" the main content of the current popularization campaign. Relevant units should incorporate this content into their designs, regulations and standards.

Scientific research units should pay particular attention to orienting their work toward coal production and construction. Research personnel should set high aims to pull the coal industry out of backwardness and to catch up with and surpass the world's advanced levels. They should cultivate a dedicated spirit and make on-site studies in order to solve crucial technical problems in production and construction. Their research topics should be closely related to production and construction. They must produce results quickly, as many as possible, and of high quality. They must carefully evaluate all re-

sults, work hard to popularize them through demonstration, and translate research results into productive forces. They must provide effective technical consultation and service in popularizing technologies. They must make the "five shifts" in the coal industry the main direction of effort in scientific research and organize efforts to master technologies, in the short run concentrating on technologies in comprehensive exploration, high speed mine construction, mining and tunneling machines, safety, mining processes and coal transformation, thereby pushing coal science and technology to a new level. At the same time, current work must be combined with long-term work to build up technical research so that research work will gain in gradation and depth and always lead the way for production and construction.

We must enhance the comprehensive capabilities of research work in coal production. This means strengthening research forces, expanding specialized research units in a planned way, reorganizing and strengthening local research units and research units attached to enterprises. The machine building system must set up units to study technological processes and design products as quickly as possible. Designing departments must take up both designing and research in technological processes. Key colleges and universities should have permanent research units equipped with specialized research personnel, making the higher institutes an important force in research. Another important aspect of work is to strengthen testing means and experimental bases. Specialized research units should establish, within a few years, test centers embracing 16 aspects, intermediate experimental plants, and industrial experimental bases. The work of collecting and publishing scientific and technological information must be strengthened. We must gradually adopt advanced means of collecting information and establish, in the next few years, a service center of coal scientific and technological literature and data, and set up, as soon as possible, a computerized information retrieval system. We must also strengthen the publication of scientific and technological periodicals and books to satisfy the needs of research personnel and for educating and training workers and staff.

While strengthening research forces of the coal industry, we must actively organize and utilize the technical forces in society and develop international exchange. We should not only organize cooperation within the coal industry but should enlist wide participation by the scientific and technical forces from the research units of other industries, the higher institutes and the enterprises to work together to develop the coal industry. We should actively adopt the technical achievements of other industries, draw on their experience, and adapt their achievements, not isolating ourselves or starting from scratch by ourselves. We should also import advanced foreign technologies, digest them and absorb them. Where conditions permit, we can conduct collaborative research and manufacture so as to accelerate scientific and technological progress, placing our starting point on a higher level.

To strengthen organization and leadership of coal science and technology, the Ministry of Coal Industry has decided to set up, step by step, a network to manage coal science and technology. A science and technology leading group will be set up at the ministry level serving as the decision-making organ for science and technology in the coal system. A chief engineer's office will also be set up at the ministry level to serve as the headquarters directing scientific and



technological work in the coal system. The existing ministry-level Technical Consultative Committee, which has already played a big role, is the consultative chief of staff in science and technology. We will also set up, step by step, technical development centers of various specializations, and joining bodies bringing together research, designing and production. The provincial coal bureaus (companies), coal mining administrations, and collieries with the necessary conditions should also set up chief engineer's offices and improve the chief engineer responsibility system. To solve the problem of inadequate funds for scientific and technological work, the ministry has approved various ways to raise funds: increase capital investment in science and technology, establish scientific and technological development fund, charging funds to costs, and setting up funds for trial production and promotion of new products. Research organizations can experiment with signing research contracts with production departments, or charging production departments for research results according to their quality, so as to earn some income. Whether the different units, under existing conditions, try their best to raise some funds for developing science and technology and providing education is an indication of whether their leading cadres have shifted their guiding ideas to "reliance" and "orientation."

Second, further implement the policy on intellectuals and bring the scientific and technical personnel's initiative into full play.

Currently the most urgent need is to strengthen the unified management and rational use of intellectuals, giving them both the authority and the responsibility of their positions and creating the necessary work environment and conditions so that they will produce more results more quickly. These matters are also uppermost in the minds of the scientific and technical personnel. The conference proposed the adoption of the following measures: 1) Leading organizations and leaders in scientific and technical fields should be able to recognize the qualifications of the scientific and technical personnel, place them in suitable positions, entrust them with responsibilities, so that they can make the best use of their knowledge and abilities; 2) Do everything possible to improve their working and living conditions so that they can work without worries; 3) Provide conditions to help them update their knowledge and keep abreast of developments. For example, provide continuing for professional cadres, no less than 3 months in 3 years, and provide them with the necessary books and materials; 4) Establish dual management systems at different levels and for different specializations; improve the evaluation, promotion and award systems for scientific and technical cadres at different levels; 5) The state stipulation to transfer a number of scientific and technical personnel to strengthen the technical forces of the coal and energy departments is a great support to us. Within our own system, we should also establish regulations enabling scientific and technical personnel to transfer to more suitable positions; and 6) Develop technical democracy: listen to the opinions of as many specialists and scientific and technical personnel as possible in making decisions on important technical questions.

Further implementation of the policies on intellectuals so as to fully mobilize their initiative is critical to progress in science and technology. It is true we still have a great deal of work to do in providing suitable living conditions

for the scientists and technicians in the coal industry, and we cannot solve all the problems in a hurry. We trust that they will understand if we explain the difficulties to them. Certainly some of the difficulties can be solved. Whether or not we do everything possible to achieve the possible is also an expression of whether or not we have shifted our guiding thinking.

At the same time, we must show concern for scientists and technicians politically, and earnestly help them raise their political-ideological understanding, so that they will develop the thinking of wholeheartedly serving the coal industry and the four modernizations. The way is open for all scientists and technicians, all intellectuals, to serve the country and make contributions. The key is to sincerely make socialist modernization one's own responsibility, orienting one's work to production and construction, and, together with the workers and leading cadres, conscientiously and with solid hard work contribute one's knowledge and ability to the development of the coal industry.

Third, strengthen education in order to promote the development of coal science and technology.

Qualified personnel is the key, and education the foundation, in developing science and technology. The root cause of the backwardness of coal science and technology is backward education and poor work in developing the intellect. Currently technical personnel account for a mere 1.96 percent of the total number of workers and staff on the coal front, and the educational level of both cadres and workers in the coal mines is universally low. It is therefore of extreme urgency to strengthen education and accelerate the training of qualified personnel. Education must be made a strategic priority.

The conference called for faster and better development of coal colleges and schools. We must provide more effective means to develop the schools, improve teaching quality, and gradually expand training capabilities. A variety of forms should be adopted to develop education for workers and staff, establishing cadres' education centers, audio-visual education centers, and centers of different types of professional and technical training, in order to bring about an upsurge in the study of science, general subjects, and political theories in coal system. Attention should be given to schools for workers' children in the mining areas so that the schools will produce qualified graduates, thereby laying a solid foundation of qualified personnel for the development of the coal industry.

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## COAL

### INVESTIGATION PROVIDES INSIGHT INTO TECHNICAL TRANSFORMATION OF SHANXI MINES

Taiyuan SHANXI RIBAO in Chinese 5 Oct 83 p 2

[Article by Hu Zhonggui [5170 1813 6311]: "A Preliminary Investigation Into Transformation of Coal Mine Technology in Shanxi"]

[Excerpt] Comrade Deng Xiaoping pointed out: "The key to the four modernizations is the modernization of science and technology." "Science and technology are productive forces. This has all along been a Marxist viewpoint." Now, in line with our reality, I would like to discuss briefly some viewpoints concerning the problem of technological transformation of the coal industry in our province.

#### We Have Benefited From Technological Transformation

In the 30 years and more since the nation's founding, many coal mines in Shanxi have carried out technological transformation to one extent or another. Particularly since the mid-seventies, when the building of new mines was far from meeting the needs of the national economy, in order to satisfy the daily growing demands by the development of the national economy on the coal energy resource, the various mining areas throughout the province launched on a general scale activities of renovation, transformation and tapping of potential. The Shigejie Coal Mine developed from a small pit with an annual output of around 10,000 tons to a large mine with an annual output of 1.2 million tons, setting an example for the technological transformation of coal mines throughout the province. Just the state-run and locally state-run coal mines under unified distribution alone have rebuilt and expanded or carried out transformation of certain links on over 40 coal mines, increasing the design capacity to 10.99 million tons and output to 21.05 million tons. From 1974 to 1982, the total output of the unified distribution coal mines throughout the province increased by 77.35 million tons, over 80 percent of which was realized through technological transformation. The Datong Mining Bureau is an old enterprise and is also a core enterprise in the coal system in Shanxi. Having undergone construction since the nation's founding, by 1974, the annual coal output had already reached some 15.5 million tons. After the technological transformation, output increased very rapidly to some 26.20 million tons by 1982, which showed an average annual increase of some 1.3 million tons. Today, it has become the enterprise in the coal industry throughout the country with the largest output and the highest profit delivered to the state. Other coal mines, such as the Yangquan and Xishan coal

mines, have also scored very great results in technological transformation. Through technological transformation, the Meiyukou mine, the Yongdingzhuang mine, the Tongjialiang mine, the Silaogou mine, the Xinzhouyao mine, the Baidong mine, the Yanya mine, the Wajinwan mine, the Jinhuagong mine, the Dadougou mine and the Wangcun mine under the Datong Mining Bureau, the four mines under the Yangquan mine, the four mines under the Xishan mine, and the Wangzhuang mine under the Luan Mining Bureau have all grown from a design capacity of 600,000 to 900,000 tons to large-scale mines with an annual output of 1.5 to 3.5 million tons. Practice has proved that all new technologies embody new economic values. An important approach to enterprise development is to carry out technological transformation by adopting new technology and new equipment on the existing enterprises.

The reason why the coal mines in Shanxi have scored relatively good results in technological transformation is that first of all, the various mining areas in Shanxi have relatively good natural factors. Shanxi has abundant coal reserves with coal fields that are spread over a wide area. Most of the coal mines have abundant reserves. Verified deposits show that Shanxi has 200 billion tons, which constitutes roughly one-third of the verified deposits throughout the country. Most of the coal mines in the existing mining areas have the resources for conducting technological transformation and expanding their production capacity. In addition, Shanxi has enjoyed a long history of coal excavation. In particular, after the development and construction over some 30 years since Liberation, it has established a fairly solid and reliable foundation for continuous development, has built up considerable managerial and technological forces and has accumulated experiences in production and construction and business management. It has prepared the proper ground in respect to management and technology for the technological transformation and the development of production of the mines.

Of course, the transformation in the past was only a preliminary and low-level one and was far from meeting the demands of the central authorities. This is manifested prominently in the stress on quantitative expansion and the exclusive pursuit of increasing output capacity and output itself and the failure to attach importance to quality, to increase in variety, and to progress in technology. The technological transformation now has a new content. It takes technological progress as the prerequisite and raising economic results as the primary indication. To a certain extent, we may say that technological progress is the life of the enterprise. In this sense, technological transformation is long-term and infinite.

#### The Future Goal of Technological Transformation

The technological transformation which we are going to conduct now is very different from the technological transformation in the past in terms of guiding ideology as well as in such aspects as the basis, factors, content, and goal of transformation. The technological transformation which we are talking about now will be carried out under the prerequisite of technological progress. Our goal will be to popularize the technology of the advanced countries, technology that has matured in the late seventies and early eighties in the existing enterprises of our country by the end of this century, and to blaze new trails accordingly. Our province is one of the

major bases of the coal industry throughout the country and has a strong foundation. We should make higher demands on ourselves and should strive to catch up with or approach world advanced levels by the end of this century. Our content of transformation generally can include the following five aspects:

First, we should reform the production development plan and implement scientific and rational production. Coal production is divided into underground extraction and openpit strip mining. Today, our province is carrying out underground mining production. In mine extraction, we must pay great attention to production arrangements, and must attach great importance to the study of the development plans from designing, prospecting to production and construction, so as to strive to use scientific methods to score rational economic results. First, we must reform production technology and methods, attempt to raise the recovery rate of coal resources, and reduce the loss and waste of these resources. Second, we must persevere in the principle of developing both extraction and tunneling, carrying out tunneling first, and speed up the progress of tunneling, to enable it to meet the needs of coal extraction and guarantee that extraction will follow normally. Third, we must implement centralized production in a rational manner, to lower the tunneling rate, reduce ineffective tunnels, lower cost, and raise economic results schedule.

Second, we should improve our technological equipment and realize mechanization in production. The coal mines under unified distribution must turn part of their blasting work faces into mechanized faces in a planned manner, and gradually utilize high-power coal-cutting machines and the hydraulic prop technique. They must develop the technology of comprehensive mechanized coal-cutting in a planned manner, digest the technology and organize study and manufacture on the basis of imported technology. They should meet the needs of development of the mechanization of coal-cutting and actively develop the mechanization of tunneling and mechanization in transportation. Local coal mines should also actively create the conditions for a gradual transition from manual production to mechanized production.

Third, we should improve the safety factor of coal mines, and realize safe and civilized production. First of all, we should improve the safety equipment in the coal mines. We must selectively use the advanced technological equipment both domestic and foreign to equip our present coal mines in a planned manner. Also, we must actively set up and perfect the remote-testing and remote-control systems, to control major underground hazards. We must set up and perfect underground sprinkling systems to strengthen dust-prevention and dust-elimination and handle properly underground industrial health and sanitation.

Fourth is the realization of modern management through improving communications, production and control systems. We should adopt new techniques and new equipment methodically, establish an advanced system of communications and strengthen the system of production command with dispatching at the core. We should transform the system of coal storage and shipping to complement production. In addition to equipment renewal, we should also vigorously promote intellectual investment, strengthen cadre and worker education, business, and technical training and work to raise the managerial and technological levels of the workers, in order to suit the needs of managing modernized production.

Fifth we should change our business method and raise the economic results of the enterprise. We must change the single-product business method of the coal mine in engaging merely in producing and selling raw coal, and develop coal dressing and processing and develop economic diversification and comprehensive utilization of coal. We must build a number of coal dressing plants in a planned manner, develop coal dressing and processing, change from mainly selling raw coal to mainly selling dressed and refined coal, raise the proportion of coal for dressing increase the dressing rate and draw up a unified product catalog and specific list of varieties according to consumer needs, thereby creating the conditions for supply at fixed points geared to demand and supply according to specifications, as well as creating the conditions for the coal enterprises in raising economic results and for society in economizing energy and transport.

Through transformation in the above-mentioned five aspects, we can work to realize the following four major changes: the change from manual production to mechanized production; the change from a lack of safety to the ability to basically control all kinds of hazards and accidents; the change from exclusive production of raw coal to sophisticated processing and a greater variety of products; and the change from a single-product line to comprehensive utilization and diversified management. We can then attempt to catch up with and surpass the world advanced level in production technology and production and business management.

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## COAL

### COAL MINISTRY BROADENS AUTHORITY OF SOME MAJOR MINES

Beijing ZHONGGUO MEITAN BAO in Chinese 19 Oct 83 p 1

[Article by Mao Yaoxian [3029 5069 0341]: "Ministry of Coal Industry Expands the Management Authority of the Dongmei and Anhui Companies"]

[Text] In order to adapt to the new situation of the restructuring of organizations and the restructuring of the coal industrial system and in accordance with the spirit of the directive issued by the central authorities concerning the necessity to transfer power to the lower levels in this restructuring, the Ministry of Coal Industry recently decided to take as pilot projects the Northeast Nei Monggol Coal Industrial Joint Company [abbreviated "Dongmei" Company] and the Anhui Coal Industrial Company, delegated a portion of management authority to lower levels and enabled the companies to have more decision-making power in business management in such aspects as personnel, financial and material resources, production, supply, and sales. In mid-September, at a discussion meeting on reform convened by the Ministry of Coal Industry, the functions and powers between the ministry and the companies were determined. The primary limits of authority which the ministry transferred to these two companies are:

With respect to planning and management: The companies are the independent planning units under the unified planning of the state, and are fully responsible for the fulfillment of the state plans. The ministry will dispatch to the companies the targets of the annual plans in respect to production, construction, financial affairs, labor wages, materials supply and allocation and transport of products. According to the annual plans sent down by the ministry, the companies will draw up annual, quarterly, and monthly plans, and implement them at the various production and construction units. In the course of implementing the plans, under the prerequisite of guaranteeing the fulfillment of the targets of the command-style plans sent down by the ministry, the companies have the power to readjust the production plans of the various mining bureaus, and to readjust individual construction projects of large-scale and medium-sized capital construction projects as well as small-scale capital construction projects. Within the scope of the present policies, the companies have the power to determine the forms of contracting and the targets of contracting of the enterprise and professional units under their jurisdiction.

With respect to production and construction: The companies have the power to examine and approve the design of the newly built mines (above-ground) and coal dressing plants that have a capacity of less than 1.2 million tons; examine and approve the development and deepening, technological transformation, rebuilding and expansion, safety technological measures, construction projects using self-raised funds of existing working mines, as well as the corresponding designs of individual construction projects and designs of the rebuilding and expansion of present coal dressing plants.

With respect to financial management: The companies will gradually implement the three-level accounting system with the companies as the independent accounting units, the mining bureaus as the internal accounting units and the factories and mines as the basic-level accounting units. Today, we have a centralized accounting of profits and losses and profit-sharing, centralized management of loans from circulating funds, centralized handling of financial tasks to be delivered to the state, and centralized control of a portion of the funds for renewal and transformation. The companies are implementing contracting of both profits and losses to the ministry, in which there is no supplement for excessive losses and there is profit-sharing when losses are reduced. The base figure for contracting is fixed for 3 years without change. The ministry will only retain 0.2 yuan per ton of coal for maintenance fee, and the rest will be allocated to the companies for use under contracting. The state will appropriate special project funds such as fees involving safety and technological measures and the concerned departments and bureaus of the ministry will appropriate to the companies the entire amount of money that is checked and ratified according to the needs of the projects. The depreciation funds which the factories directly under the companies and the capital construction building enterprise units should deliver to the ministry will be retained for overall disbursement and use by the companies.

With respect to material supply: The companies will draw up a unified plan for use of materials under unified planning by the ministry for the units directly under them, reporting the plan to the state, and organize the placement of orders for goods in a unified manner. The companies will make overall arrangements as to targets for distribution of materials which the ministry assigns them.

With respect to personnel and labor wages: The companies and the units directly under them will handle the cadres at and below the department level, determining the wage scales of units below the county and team levels. The companies have the power to examine, approve, and supplement a target for natural reduction of personnel under the labor wage plan approved by the state; dispatch to lower levels seasonal temporary workers and wages; balance and readjust the labor forces among the units directly under them, including trans-provincial (regional) transfers. The companies have the power to make rational readjustment of the targets assigned them concerning newly increased labor forces in light of the production and construction needs and the companies will directly assign the targets to the units directly under them.

With respect to scientific research and education: The companies will be responsible for drawing up scientific research plans, plans for assessing scientific research results, and plans for popularizing scientific research projects



and new technologies of the company as a whole. While the ministry will be responsible for examining and approving the designing programs and assessment outlines of the key projects that are listed as the ministry's scientific research plans, the companies will be responsible for the specific management work. The companies will be responsible for managing various types of schools directly under them and worker education.

The Ministry of Coal Industry has delegated a considerable amount of power to the lower level and broadened the decision-making power of the Dongmei Company and the Anhui Coal Industrial Company. This will effectively promote the gradual transition of the companies from administrative and management organs to economic entities. This reform of the system and method of management has embodied important significance to the restructuring of the coal industrial system of management, the improvement of the method of work and work style of the ministry and government organs, to the raising of efficiency in work, and to the consolidation of the fruits of the reform of organizations.

9335

CSO: 4013/40

COAL

## CHONGQING LENDS TECHNICAL SUPPORT TO DEVELOPING COAL INDUSTRY

Chengdu SICHUAN RIBAO in Chinese 6 Oct 83 p 1

[Article by Li Xianfu [2621 7359 4395]: "Chongqing Coal Mining Design Institute Contributes to Energy Resource Development"]

[Text] In order to develop energy resources, the Chongqing Coal Mining Design Institute has sent its technical forces to accelerate the key national coal mine construction projects in Shanxi and Guizhou. At the same time, it has completed the new construction and expansion of 16 plants and mines in Sichuan efficiently and economically. Significant results have been achieved.

The Chongqing Coal Mining Design Institute is strong technically, with specialized fields. In order to accelerate the construction of the nation's energy resources, they have undertaken the design and feasibility study of the new construction and expansion of ten large-scale mines, such as the overall planning of the Fen-Xiao mining area in Shanxi which produces 15 million tons annually, and the 3 million-ton coal washing plant at the Liupanshui Mine in Guizhou. After the tasks were undertaken, the president, secretary, and chief engineers invited a number of people to visit the Fen-Xiao mining region. Over 100 people were sent to work in Shanxi at one time or another. When performing the design of converting the Shuiyu mine from 900,000 tons to 2.4 million tons, despite the difficulties in local living conditions, the sandstorms, and the dry weather, the design personnel still produced a high quality design and the mission was accomplished 2 months ahead of schedule. The Guizhou Liupanshui mining area is a construction project of Southwest Energy Development Corporation which used foreign investments. Within a week after the Institute accepted the task, two teams of over 40 people were organized to go to Guizhou. As of the present moment, the five projects undertaken for that mining area have been completed ahead of schedule according to various stages. In the past 2 years, this design institute has undertaken the design for the new construction and expansion projects in 16 plants and mines, such as the Pengchun Mine in the Songzao Mining Region in Sichuan which produces 300,000 tons annually, Sanhuierjing of the Tianfu Mining Bureau which produces 600,000 tons annually, and the Jinjiyan Coal Washing Plant, etc. The Institute actively organized design teams to go to the various sites to collect information and to step up the design work. The coal dressing plant at Jinjiyan was an engineering project undertaken in coordination with the Chongqing Power Plant. The Government required concurrent construction. The time was tight and the task heavy.

The project director, present vice president of the Institute, Wang Chengjia [3768 2052 1367], brought over 20 people to Qijiang. They worked day and night, taking only 3 months to complete the preliminary design which would normally take half a year to finish. The highway design time requirement was very tight for the Binlnag Mine in Huayingshan. The engineering team was waiting to move onto the site. The Institute organized some 20 engineering geology, survey, and design personnel led to the site by Chief Engineer Zhou Fangdan [0719 2455 2481]. They determined routes and performed survey and design work simultaneously, submitting the drawings to the work units in 2 months. The work was rated highly by the Ministry of Coal Industry.

12553

CSO: 4013/36

## COAL

### JIANGSU, HENAN PLAN JOINT COAL FIELD DEVELOPMENT

OW140844 Beijing XINHUA in English 0828 GMT 14 Dec 83

[Text] Zhengzhou, 14 Dec (XINHUA)--Work will begin early 1984 on a new coal field to be jointly developed by Henan and Jiangsu Provinces, according to the Henan Provincial Coal Mining Administration.

Under an agreement concluded earlier this year, Jiangsu will contribute capital investment to the low-sulphur anthracite field in Yongcheng County, Henan Province, which has verified reserves of 2.9 billion tons. Thirty percent of the fields' output will go to Henan and 70 percent to Jiangsu, for a period of 50 years after the field goes into operation.

The first phase of the joint project calls for building within three or four years a shaft mine to produce 600,000 tons annually, the administration said. Construction costs are estimated at 100 million yuan (about 50 million U.S. dollars).

There will eventually be six or seven shaft mines in Yongcheng, with a combined output of six million to seven million tons a year.

Henan is China's second largest coal producing province, after Shanxi. Jiangsu Province, which is more advanced technically and has greater financial resources, will be responsible for planning, designing and sinking the coal shafts, on the basis of geological reports prepared by Henan.

The joint project is part of China's effort to raise economic efficiency by encouraging various administrative areas to combine their technical or economic resources.

CSO: 4010/21

## COAL

### BRIEFS

1984 NATIONAL PRODUCTION--NCNA, 25 Dec--According to statistics from the Ministry of Coal Industry, the nation's unified distribution mines produced 356 million tons of raw coal in 1983, completing the plan for the year 7 days ahead of schedule for a 3.6 percent increase over the same period for 1982. Nationally, the grand total for raw coal production was 680 million tons. This goal, achieved 12 days ahead of schedule, represents a 7.8 percent increase over the same period for 1982. [Text] [Beijing RENMIN RIBAO in Chinese 27 Dec 83 p 2]

NEW HUAIBEI DISCOVERIES--This year [1983] Anhui geological departments have discovered three new coal fields in the Huaibei region covering an estimated total area of 430 square kilometers. This discovery improves the picture for further development of the "Liang Huai" fields. Since the beginning of the year, the Anhui Bureau of Geology and Mines has stepped up geological coal prospecting in this region. The Bureau's 325 and 337 geological teams conducted deep drilling in the zone including Suixi, Woyang, and Fudong and discovered, after drilling six holes at a depth of more than 500 meters, 17 layers of coal, some with a thickness of over 12 meters containing coking and anthracite coal. [Text] [Beijing RENMIN RIBAO in Chinese 28 Dec 83 p 3]

NEW SHANXI MINES--Taiyuan, 22 Nov (XINHUA)--Construction of a large, fully mechanized shaft mine with an annual production capacity of 4 million tons of coal has begun at Malan, 70 kilometers northwest of Taiyuan, capital of Shanxi Province. The project is the third in the Gujiao mining area, being built into China's largest coking coal center, with a designed annual capacity of 16.5 million tons. The center is being built with Japanese loans. Construction of the first and second shaft mines started in 1979 and 1982 respectively, with a combined annual production capacity of 4.5 million tons. The Malan mine site has a workable coal reserve of more than 600 million tons. The first stage of the project is scheduled to be completed in 1988. Preparations are being made for construction of two more mines in the area, each with a designed annual capacity of 4 million tons. [Text] [OW221424 Beijing XINHUA in English 1033 GMT 22 Nov 83]

LIAONING LOCAL COLLIERY OUTPUT--Local collieries in Liaoning Province prefulfilled the 1983 raw coal production plan by 36 days. As of 25 November, collieries run by cities, prefectures, and communes and brigades produced a total of 5.4 million tons of raw coal, an increase of 550,000 tons over the corresponding 1982 period, a record high. It is expected that by the end of 1983, the total raw coal output of local collieries across the province will exceed 6 million tons. [Excerpt] [Shenyang Liaoning Provincial Service in Mandarin 1030 GMT 26 Nov 83 SK]

JILIN RAW COAL OUTPUT--As of 26 November, state-run local collieries across Jilin Province had overfulfilled the annual state-assigned raw coal production plan of 3.1 million tons by 7,000 tons, 35 days ahead of schedule. [Excerpt] [Changchun Jilin Provincial Service in Mandarin 1030 GMT 3 Dec 83 SK]

HEILONGJIANG LOCAL COLLIERY OUTPUT--As of 18 October, local collieries in Heilongjiang Province had fulfilled the annual production plan of 8.9 million tons of raw coal, an increase of 1.21 million tons over the corresponding 1982 period. As of 22 September, Yilan coal mine--a money-losing mining enterprise in the province--had prefulfilled the annual target of 350,000 tons of raw coal by 100 days, topping 1982's output by 40 percent. [Excerpts] [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 18 Oct 83 SK]

JIANGSU COAL PRODUCTION--By the end of September, Jiangsu Province had produced some 12.54 million metric tons of coal. This was 1.15 million metric tons more than the original production quota for the first three quarters of this year, and exceeded 82 percent of the total annual output target. [Summary] [Nanjing Jiangsu Provincial Service in Mandarin 2300 GMT 5 Oct 83 OW]

HEBEI COAL PRODUCTION--Shijiazhuang, 26 Nov (XINHUA)--Coal mines operated by local authorities in Hebei Province met the annual production target 46 days ahead of schedule. As of 15 November, they had produced 12.86 million metric tons of coal. This surpassed the output for the same period of last year by 1.18 million metric tons. [Excerpt] [Beijing XINHUA Domestic Service in Chinese 0020 GMT 26 Nov 83 OW]

NEI MONGGOL 1983 COAL OUTPUT--Nei Monggol Autonomous Region's state collieries and collieries whose products are distributed under the state unified plan scored good achievements in raw coal production. As of 22 December, Wuda, Baotou and Haibowan Administrative Bureaus produced 7.4 million tons of raw coal, prefulfilling and overfulfilling the state assigned raw coal production plan. [Summary] Hohhot Nei Monggol Regional Service in Mandarin 1100 GMT 26 Dec 83 BK]

SHANDONG 1983 COAL OUTPUT--As of 25 December, Shandong Province's collieries whose products are distributed under the state unified plan fulfilled the annual coal production plan 6 days ahead of schedule, and the collieries whose products are distributed under the province's unified plan prefulfilled the annual coal production plan by 25 days. As of 25 December, the province produced 42.04 million tons of raw coal, overfulfilling the annual production plan by 840,000

tons, and prefulfilled the annual production plan by 840,000 tons, and prefulfilled the annual tunneling footage and redressed coal production plans by 57 days and 30 days respectively. [Summary] [Jinan Hsandong Provincial Service in Mandarin 2300 GMT 26 Dec 83 SK]

SHAANXI 1983 COAL OUTPUT--Shaanxi produced 21.23 million tons of coal in 1983, overfulfilling the plan. Some 23,000 meters of tunneling have been completed. [Summary] [Xi'an Shaanxi Provincial Service in Mandarin 0500 GMT 31 Dec 83 HK]

XINJIANG 1983 COAL OUTPUT--By yesterday, the Xinjiang coal department had overfulfilled the 1983 state quota for raw coal production 13 days ahead of schedule. All department coal mines produced a total of more than 3,768,000 tons of raw coal, which was 6.43 percent more than in the same period last year. [Summary] [HK211318 Urumqi Xinjiang Regional Service in Mandarin 1300 GMT 19 Dec 83]

SHANXI 1983 COAL OUTPUT--Taiyuan, 13 Dec (XINHUA)--Shanxi Province, China's largest coal producer, had by 10 December cut 145.35 million tons of coal, meeting the target for 1983 21 days ahead of time, according to the provincial coal authorities. The target for this year is 145 million tons. This year the state invested more than 460 million yuan, about 156 million more than last year in Shanxi, the largest sum since the founding of the People's Republic in 1949. About 22 mines have been under construction or expansion. The one completed added an annual capacity of 600,000 tons. The success was also attributable to the popularization of mechanized coal cutting in the province. The north China province has a known coal reserve of more than 200 billion tons, accounting for one-third of the country's total, and has produced one-fifth of China's coal annually in recent years. [Text] [OW131217 Beijing XINHUA in English 1155 GMT 13 Dec 83]

ZHEJIANG 1983 OUTPUT--As of 15 December, various coal mines in Zhejiang Province had produced more than 1.38 million metric tons of coal, fulfilling the provincial coal-production task for 1983 ahead of schedule. Since the beginning of this year, leading groups of a number of coal mines have been readjusted and various coal mines have carried out reform work and promoted the economic responsibility system. All these activities have promoted coal production. [Summary] [Hangzhou Zhejiang Provincial Service in Mandarin 1030 GMT 24 Dec 83 OW]

RECORD HENAN OUTPUT--As of yesterday, Henan's output of raw coal has exceeded the 60 million-ton level. The output also exceeded the gross output for 1982, hitting an all-time high. Coal enterprises directly under the provincial authorities have delivered over 44.55 million yuan of tax and profits, an increase of 45.2 percent over the same period last year. A large number of enterprises are emerging whose output and economic results are improving in step and advanced units breaking record output levels. Since the beginning of this year, the provincial coal industry department has been grasping both the structural reform in organizations and units under them and the construction

for coal production. Mines at various levels, coal bureaus in various prefectures and cities, and all companies have established the responsibility system level upon level, with emphatic stress on economic results. [Summary] [HK061539 Zhengzhou Henan Provincial Service in Mandarin 1130 GMT 19 Dec 83 HK]

NEW NEI MONGGOL DEPOSITS--Hohhot, 23 Dec (XINHUA)--Reports from Inner Mongolia say that three more coal fields have been discovered with coal reserves of more than 4.5 billion tons. The newly discovered deposits in the eastern part of the region are all lignite. Inner Mongolia has been a major area to look for coal in recent years in China. This year, 1,700 geologists in 12 teams working here discovered 9.5 billion tons of coal reserves. Inner Mongolia now has known coal reserves of 198 billion tons, and only Shanxi Province has greater reserves. [Text] [OW232042 Beijing XINHUA in English 1038 GMT 23 Dec 83 OW]

SHAANXI RESERVES--Xian, 28 Dec (XINHUA)--Reserves of a new coal field in northwest China's Shaanxi Province are estimated at 102.1 billion tons, according to a release by the provincial planning commission today. The northern Shaanxi coal field covers six counties along the northern border of the province. There are four to five recoverable coal seams, averaging 4 meters in thickness. Shallow and easy to cut, the deposits are long-flame, non-caking coal, containing little ash and sulphur. The coal here doesn't need washing and may be used directly as steam coal or as raw material for the chemical industry. The coal field is close to railway lines not far from the railway hubs of Baotou and Datong and is close to the Huang He, making transport easy. The development of the coal field will help boost the growth of the economy in northern Shaanxi and in the whole of northwest China. [Text] [Beijing XINHUA in English 1034 GMT 28 Dec 83 OW]

CSO: 4010/44



## OIL AND GAS

### SURVEY RESULTS SHOW TARIM BASIN PROMISING IN OIL RESERVES

HK130342 Urumqi Xinjiang Regional Service in Mandarin 1300 GMT 11 Dec 83

[Text] The Northwest Petroleum Geological Bureau of the Ministry of Geology and Minerals held a geological prospecting findings briefing conference in Urumqi recently. During the conference, the participants gave briefings on the findings of the geological survey conducted in Tarim basin in the past few years, analyzed and discussed the oil and gas prospecting work in the northwest, deliberated on the short-term plan for oil and gas survey, and made preliminary preparations for the development of the Xinjiang Region and the northwest. Present at the conference were more than 90 specialists, scholars, engineers, and technicians from various units under the Ministry of Geology and Minerals who are actively engaged in petroleum geological research, teaching and production. Some specialists and scholars from the Ministry of Petroleum Industry and the Lanzhou Geological Research Institute of the Chinese Academy of Sciences gave academic reports at the conference on invitation.

Since 1978, the Northwest Petroleum Geological Bureau has extensively carried out gravitational tests and electrical geophysical prospecting, drilled a few prospecting wells in Tarim basin, and thus collected some important petroleum geological information. The participants in the conference held: These findings provide new scientific data for a more thorough study of the sedimentary characteristics, geological structure, geological history, and the origin and accumulation of oil and gas in the Tarim basin which will be useful for locating oil reserve areas and for drawing up the prospecting plan.

The conference held: In light of available data, the Tarim Basin has very favorable geological conditions for oil and gas reserves and has highly promising oil deposits. Medium- and small-sized basins in eastern Xinjiang, such as Turpan, Hami, Santanghu, Barkol, and so on, have good conditions for origin and accumulation of petroleum. The possibility for discovery of oil and gas in these areas is relatively high.

Under the guidance of the CPC Central Committee's directive on the development of the Xinjiang region and the northwest, the participants in the conference conscientiously deliberated on the short-term plan for oil and gas survey in the northwest and assigned prospecting work for the future.

CSO: 4013/59

## OIL AND GAS

### BRIEFS

1983 NATURAL GAS OUTPUT--Beijing, 8 December (XINHUA)--China has fulfilled the 1983 plan for natural gas production 1 month ahead of schedule, the Chinese Ministry of Petroleum Industry announced here today. By the end of November, China had pumped 11.19 billion cubic meters of natural gas, 101.7 percent of the 1983 plan, the ministry said. China produced 11.93 billion cubic meters of natural gas last year. [OW081235 Beijing XINHUA in English 1209 GMT 8 Dec 83]

SHENGLI OILFIELD EXCEEDS TARGET--Jinan, 31 December (XINHUA)--The Shengli oilfield in Shandong Province has produced 18.36 million tons of crude oil this year, 2.06 million tons over its planned target and up more than 12 percent over 1982, according to officials here. The oilfield also produced 1.04 billion cubic meters of natural gas. The officials said 460 new production wells capable of pumping 1 million tons a year were put into operation this year. Shengli now produces an average of 55,000 tons of crude oil daily, a new all-time high, they added. [Text] [OW310818 Beijing XINHUA in English 0803 GMT 31 Dec 83]

XINJIANG 1983 CRUDE OUTPUT--Urumqi, 28 December (XINHUA)--The Xinjiang Uygur Autonomous Region fulfilled its 1983 crude oil quota of 4 million tons 22 days ahead of schedule. It is estimated that Xinjiang's total oil output this year will be 4.27 million tons, 5 percent more than last year. A 5,000-square-kilometer zone bearing rich oil and gas reserves has been discovered recently at the Karamay oilfield in Xinjiang. In recent years, more than 700 new oil wells have been drilled and the oilfield has been expanded by 100 square kilometers since 1981. Its daily output has remained at more than 10,000 tons since 1980. More than 400 oil-bearing structures have been discovered in the region, making it one of the major oil producers of the country. [Text] [OW281254 Beijing XINHUA in English 0734 GMT 28 Dec 83]

NEW FINDS IN JUNGGAR--Beijing, 26 December (XINHUA)--Thirty potential oil and gas-bearing structures and one oil field have been discovered by French and Chinese seismic teams in Xinjiang's Junggar Basin in the past 3 years, GUANGMING DAILY reported today. Since 1980, three teams from the General Geophysical Company of France, under contract to the China National Petroleum Corporation, have been working in the basin with seven Chinese teams. Thirteen parameter and exploratory wells have been drilled, the paper says. Oil and gas indications have been reported from four wells and oil flows of commercial value from two, it adds. The three teams, with 52 French experts and 339 Chinese workers, have completed 8,686 kilometers of seismic surveying lines in the past 3 years,

40 percent above their quotas. Under a 3-year Sino-French cooperation plan, seismic geological surveys were conducted for the first time in the deserts in the heart of the Junggar Basin and in the eastern part, according to GUANGMING DAILY. Data obtained on the basin's geological structure and stratigraphical sequences are considered of great value in assessing the oil prospects there, the paper says. [Text] [OW260742 Beijing XINHUA in English 0659 GMT 26 Dec 83]

NEW OIL-BEARING ZONE DISCOVERED--Karamay, 17 December (XINHUA)--A 5,000-square-kilometer zone bearing rich oil and gas reserves has been discovered at the Karamay oilfield in northwest China's Xinjiang Uygur Autonomous Region, according to local petro-geologists. Called an "overthrust," the zone, which is more than 250 kilometers long and 20 kilometers wide, was found following an earlier discovery of a 100-square-kilometer oil-bearing zone. More than 700 oil wells have been sunk at Karamay since 1981, and 600 more will be drilled in 1984 and 1985, the last 2 years of China's Sixth Five-Year Plan. By the end of 1985, Karamay's oil reserves and its annual output will be up by a big margin. Efforts have also been made to improve production in existing wells through the use of water injection, fracturing, and repairing. Developed in 1958, the Karamay oilfield now produces some 4 million tons of crude oil a year. It has produced more than 10,000 tons a day since 1980. Karamay this year had pumped out 4.07 million tons of crude oil by 16 December, some 40,000 tons more than in 1982. Xinjiang will be a major center of onshore oil exploration and development in the years to come, according to the Ministry of Petroleum Industry. [Text] [OW171529 Beijing XINHUA in English 1451 GMT 17 Dec 83]

JILIN OILFIELD DISCOVERY--A new oilfield was recently discovered in the southern part of the Songliao Basin and exploitation is being vigorously carried out. It is expected that by 1985, it will be built into a medium-sized oilfield which will ensure stable yield of the Jilin oilfield. [Excerpt] [Changchun Jilin Provincial Service in Mandarin 1030 GMT 7 May 83 SK]

LIAONING CRUDE OUTPUT--Liaohe oilfield, Liaoning Province, has produced 5.4 million tons of crude oil as of 21 November, prefulfilling the annual state-assigned crude oil production plan by 40 days. The crude oil output increased 17 percent over 1982, a record high. [Excerpt] [SK270602 Shenyang Liaoning Provincial Service in Mandarin 1030 GMT 22 Nov 83]

SICHUAN DISCOVERIES--Chengdu, 8 Dec (XINHUA)--A total of 61 new oil-gas wells of industrial value were drilled [in 1983] in Sichuan Province, China's largest natural gas producer, according to Sichuan oil authorities. In addition, two new gas-bearing structures and 19 oil-gas zones are reported to have been discovered. Sichuan had pumped 4.8 billion cubic meters of natural gas by the end of November, meeting 96 percent of [the 1983] quota, and completed the year's oil production plan 2 months ahead of time. The province produced 5.2 billion cubic meters of natural gas [in 1983]. [Text] [Beijing XINHUA in English 0244 GMT 8 Dec 83 OW]

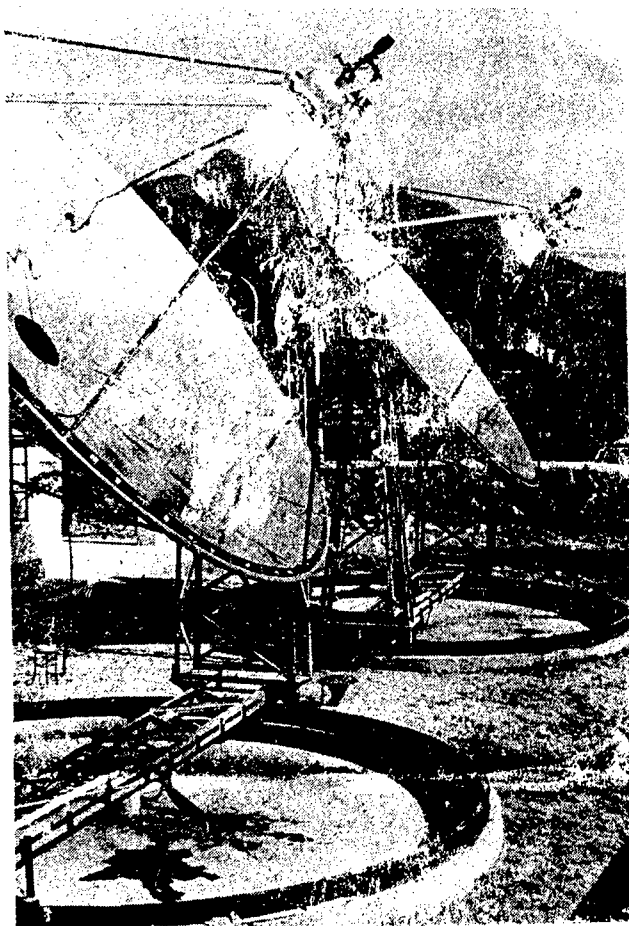
RECORD LIAOHE PRODUCTION--The Liaohe oilfield in Liaoning had produced more than 6 million tons of crude oil by 26 December, a record annual production of this oilfield, and is 13 percent more than the 1982 figure. The oilfield also overfulfilled by 3.68 percent its annual natural gas production quota. [Summary] [Shenyang Liaoning Provincial Service in Mandarin 1030 GMT 28 Dec 83 SK]

SUPPLEMENTAL SOURCES

NEW 5-METER FOCUSING COLLECTORS SUCCESSFULLY PRODUCED

Guangzhou NANFANG RIBAO in Chinese 28 Dec 83 p 1

[Photograph and caption]



Two 5-meter-diameter focusing solar collectors have been successfully developed by the Naval Engineering and Design Bureau. These solar boilers employ an automatic tracking system and a polyester fiber aluminum-coated membrane, a new and highly reflective material.

Above, the solar-collectors are shown tracking the sun.

CSO: 4013/75

## CONSERVATION

### OIL-TO-COAL CONVERSIONS COULD REDUCE OIL CONSUMPTION DRAMATICALLY

Beijing JINGJI RIBAO in Chinese 14 Nov 83 p 2

[Article by Li Renjun [2621 0086 0193]]

[Text] Petroleum is an important, non-renewable energy resource. The proven and potential petroleum reserves in the world are clearly inadequate compared to the needs of the world population. According to predictions by foreign petroleum experts, the proven petroleum reserve will be exhausted in several decades, but there has not yet been a major breakthrough in discovering new energy resources. Petroleum is not an ordinary fuel; under current technical and economic conditions, no other fuel has been found that is economical and can completely replace petroleum to be used in motorized vehicles (airplanes, automobiles, etc.). Petroleum is also an economical raw material for the organic chemical industry; currently, 90 percent of the organic chemical plants use petroleum as raw material. Most countries in the world use petroleum primarily for extracting gasoline, kerosene, diesel fuel, and lubricating oil for motor vehicle, and as raw material for the organic chemical industry. Most industrialized nations are very concerned about the effective utilization of petroleum resources. After two Mideast oil crises, both industrialized and developing countries are actively seeking ways to conserve and replace petroleum as an energy source. One of the measures is to convert oil-burning boilers to burn coal. During the period from 1979 to 1981, the amount of oil consumed by boilers in industrialized nations decreased from 713 million tons to 601 million tons, a 15.7-percent drop. Therefore, China's policy on oil conservation and effective use of petroleum resources is consistent with this trend.

In our country, energy resource is the limiting factor of economic growth; in particular, petroleum is even a more limiting factor than coal. Based on current projections, China may be very rich in petroleum resources, but the proven reserves are inadequate; during the "6th Five-Year Plan," the annual production is only a little more than 100 million tons. From the standpoint of long-range development needs, petroleum should be classified as a critical resource to be conserved. But the utilization of petroleum in China is poorly planned;

in 1980, the amount of petroleum burned in boilers and ovens was 41 percent of the annual production, higher than that for the major industrialized nations. This is a tremendous waste. Therefore, we must continue the effort to reduce oil consumption. It should be understood that effective utilization of petroleum resources and oil conservation is a long-range policy, not a temporary measure.

From the perspective of economic benefits in petroleum utilization, a certain fraction of the 40 million tons of petroleum consumed annually can be justified on technological grounds; in some other cases, various constraints prevent the immediate conversion from petroleum to coal. Excluding these cases however, at least 20 million tons of petroleum now consumed can be replaced by coal. This will result in 7 to 8 billion yuan of direct income to the state (not including the social benefits derived from the finished products of 20 million tons of petroleum).

It may be asked that if oil-burning boilers are converted to coal, will they contribute to an increased pollution level in the atmosphere? Based on experiences both at home and abroad, atmospheric pollution can be controlled by taking the appropriate measures using existing technologies. In a report published in May 1983 by the Environmental Bureau of Japan, the results of a survey of 217 units over a period of 4 years showed that after conversion from oil to coal, the amount of smoke and dust, nitrogen oxide, and sulfur oxide have been controlled at a level which is slightly lower or essentially the same as that before the conversion.

In order to implement the policy of oil to coal conversion and effective use of petroleum resources, the following measures should be taken:

1. For those projects that have been designated as part of the revised "6th Five-Year Plan," special persons-in-charge should be identified to organize the work, so that the projects can be completed on schedule and according to specifications. A special oil-to-coal funding office should provide the necessary capital, materials, and equipment according to project schedule. After completion of the project, it must ensure the timely supply of coal to support production.
2. The oil-burning boilers which are designated for conversion must undergo active preparation and listed as part of the "7th Five-Year Plan" to ensure timely conversion. Every effort should be made to meet the goal of reducing oil consumption by 20 million tons during the period of the "7th Five-Year Plan."
3. For those industrial oil-burning boilers which are found to be difficult to convert, the technique of burning coal-oil mixture (COM) may be used to minimize oil consumption. In using this technique, however, the problem of producing and supplying pulverized coal must be addressed. Pulverized coal may be produced at a centralized location and transported like cement to dispersed boilers by special trucks. This task should also be included as part of the "7th Five-Year Plan" and be actively promoted.

4. When conditions permit, all the oil fields, oil refineries, chemical fertilizer plants, chemical fiber and other chemical plants, oil-burning steam generators and private power stations should also be converted to coal to conserve resources and reduce cost.

5. A responsibility system should be established for oil conservation. For those boilers targeted for conversion by the government, the user organization must complete the conversion on time. If the conversion is delayed without a justifiable excuse, the allocated oil quota should be decreased and replaced by coal; if the conversion is completed on or before schedule, the organization should be rewarded accordingly.

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## CONSERVATION

### HUGE POTENTIAL SEEN FOR ECONOMIZING ON USE OF COAL

Beijing JINGJI RIBAO in Chinese 10 Oct 83 p 2

[Commentary by Staff Reporter: "Need for More Efficient Fuel Supply Policy Stressed"]

[Text] According to statistical data, China's energy consumption in producing every billion U.S. dollars of national income is two to five times that of industrially developed countries in the world. These considerable disparities show that China's potential to save energy is also tremendous. To succeed in conserving energy, we must examine the potential for saving in every area. Improving the management and supply of fuel resources is an important link.

Coal makes up most of China's energy resources. We produce many different types of coal which vary considerably in calorific value, volatile content, and size. Today, energy-consuming facilities in industrial and communications enterprises also have different requirements regarding the calorific value and size of coal. For example, fine-coal electrical machinery plant boilers at thermal power plants require coal of less than 6 millimeters in size, while chain [grate] boilers and reciprocating boilers need a coal size smaller than 25 millimeters. Industrial boilers generally call for lump coal, whereas gas-producing boilers burn small and medium coal which has a high thermal stability, high mechanical density, low ash melting point, and low viscosity. At present, owing to a multitude of reasons, localities and departments frequently change the type of coal they use, often failing to meet the requirements of their energy consuming facilities. As a result, these facilities become more vulnerable to damage, and there is no way to ensure the quantity of energy which the production process demands. One way of resolving this contradiction is coal matching. Coal matching means taking different types of coal which vary in size, in calorific value, etc, processing them, and mixing them according to certain proportions. Every grade of matched coal has a specific calorific value and size. It is up to the consuming enterprise to choose the right grade in light of the actual needs of its energy-using facilities. According to preliminary estimates, the use of matched coal instead of raw coal generally can save about 5 percent on energy. We can now produce only about 15 million tons of matched coal annually. Of this amount, the municipalities of Beijing, Tianjin, and Shanghai produce about 1 million, 1.5 million and 1.3 million tons respectively, which is far short of demand. Most localities in the nation still burn whatever type of coal that is available, burning raw coal at random. If fuel-



supplying units nationwide can increase the production of matched coal so that it can satisfy the entire nation's demand, we can save a great deal of coal.

At present, the energy-using facilities built by many of our industrial and communications enterprises are not rational enough. Some are like 'a big horse pulling a small cart', others 'a small horse pulling a big cart'. Moreover, every enterprise has its own complete system of boiler facilities, creating a profusion of small boilers in close proximity to one another. Some have an excess capacity while others fail to satisfy the requirements of the enterprises. To counteract this situation, the fuel-supplying units in many provinces and municipalities play the role of a 'go-between', as well as providing a real service. They bring together two or more factories which are close to one another, have an excess energy capacity, and possess the requirements for supplying steam jointly, and, through unified planning, engage in the integrated supply of steam. In this way, we will need fewer boilers, economize on coal, and cut down on manpower, the costs of boiler maintenance, and environmental pollution, thereby killing several birds with one stone. The Tianjin Municipal Coal Construction Company began this task back in 1978. By the end of July 1983, it had already facilitated integrated steam utilization by 100 factories in 45 groups, and has saved more than 41,300 tons of coal. If all fuel-supplying units across the country include this piece of work in their agendas and do a thorough, meticulous job, they can save a great deal of coal. By means of economic sanctions or administrative measures, and working through the responsible departments, they should set a deadline for a reduction in energy consumption in those enterprises which have long ignored energy conservation and have been wasteful of energy resources.

In addition, the fuel-supplying units of many provinces and municipalities are reclaiming such low-grade fuels as gangue and flue ash, etc, for processing and utilization. During the first half of this year, Xi'an Municipality recovered 38,900 tons of gangue and flue ash, thereby saving 9,700 tons of high-grade coal.

In short, there is much the fuel-supplying units can do to conserve energy. If only they take this problem seriously and do so persistently, they have much to contribute to energy conservation.

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## CONSERVATION

### BRIEFS

DAQING ENERGY-SAVING STEPS--Harbin, 26 Jan (XINHUA)--Daqing, China's largest oilfield, saved 66,800 tons of oil and 82 million cubic meters of natural gas in 1983, the Daqing Petroleum Administration reported today. In addition, 130 million kilowatt-hours of electricity were saved, 136,000 tons of spilt crude oil collected and 87,000 tons of light hydrocarbons recovered last year, a spokesman for the administration said. Energy-saving techniques were adopted throughout the oilfields in Heilongjiang Province, he said, adding that 121 inefficient boilers were upgraded or discarded and gasoline-saving devices were fitted on 5,300 trucks. Daqing had produced 51 million tons of crude oil by 22 December 1983, about half of China's total output. [Text] [Beijing XINHUA in English 1526 GMT 26 Jan 84 OW]

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